BBE WHOPPER AUTOGYRO—IS IT A WHIRLY BIRD OR A PLANE?

48120 February 1991

MODEL AIRPLANE NEWS

THE WORLD'S PREMIER R/C MODELING MAGAZINE

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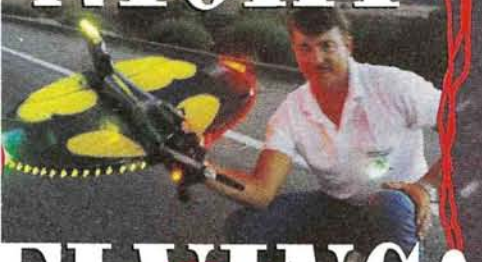
NIGHT FLYING!



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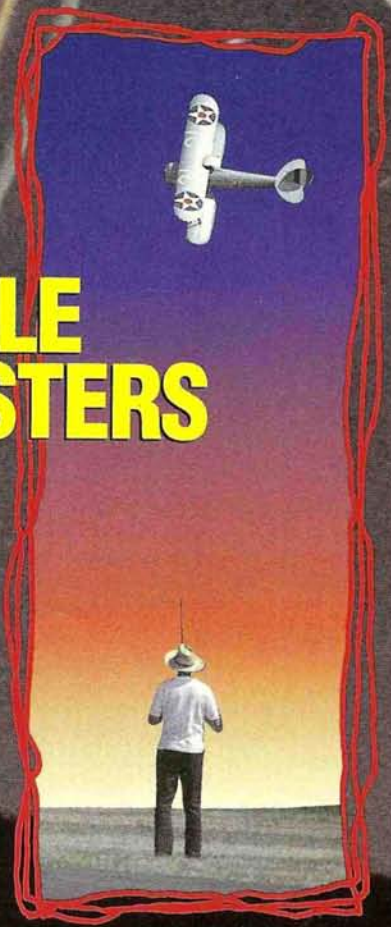
SCALE MASTERS '90



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FEBRUARY 1991 VOLUME 119, NUMBER 2

MODEL AIRPLANE NEWS

FEATURES

ON THE COVER: an amazing vision of R/C night flying paints this month's cover. Left inset: author Dave Herbert with "Batplane" (see page 26). Right inset: Dick Hansen performs in-close demo flight with Nieuport at the Masters (page 36). Above: Diego Lopez's A-1 Skyraider near touchdown (page 36).

HELICOPTER SECTION

CONSTRUCTION

COLUMNS

DEPARTMENTS

Model Airplane News (ISSN 0026-7295) is published monthly by **Air Age, Inc.**,251 Danbury Rd., Wilton, CT 06897. Second-class postage paid at Wilton, CT, and additional mailing offices. Subscription rates: $24.95 for 1 year (foreign, $34.95); $45.95 for 2 years (foreign, $65.95). **Postmaster:** send Form 3597 to **Model Airplane News,** P.O. Box 428, Mount Morris, IL 61054.

EDITORIAL

by TOM ATWOOD

ONE OF THE KEY ATTRACTIONS of our great hobby is the unending, multifaceted challenge it offers modelers—starting with that first kit and solo flight. Whether you're a new sport flier looking at a scratch-building project, or a veteran modeler pushing the limits of the technology, aeromodeling always offers a challenge. The icing on the cake is provided by R/C competition flying, which is enjoyed by participants and spectators alike. How many hobbies offer so much?

Recently, two awesome competitions seized my attention: one has just past, and one is upcoming. The 1990 Tournament of Champions (November 8 to 11) was an inspiring, epic contest of R/C giants (Chip Hyde—above—won the $25,000 1st prize). Sponsored by Circus Circus Enterprises, the TOC occurs only once in two years, and it's limited to 22 contestants—the best precision aerobatic R/C pilots on the planet!—half of them selected from the U.S. and half from abroad. (See full coverage of the TOC in these pages next month.)

Plans for the October '91 "First Annual R/C Unlimited Air Races and Airshow Competition," are speeding forward with three central California sites being considered. Tom Easterday of R/C Unlimited Racing, Inc. reports 27 registered entrants as we go to press, with nearly a dozen more likely contenders building planes or seeking sponsors. More than $25,000 has been committed for prize money, and full media coverage is expected.

Planes must be an outline scale version (within 5 percent) of any full-size, unlimited racer that qualified for the Reno National Championship Air Races. They must have a minimum wingspan of 100 inches and a maximum weight of 55 pounds, and any choice of piston (or rotary) engines may be used. For further information, call (714) 255-0747, or write to Tom at 565 Mercury Ln., Brea, CA 92621. We'd like to provide coverage of teams and planes in preparation, so if you're involved and interested, write or call!

Do you think the most important benefit offered by the AMA is insurance? Did you know that as of January 1, 1991, the AMA no longer provides liability protection for any AMA member to AMA member, or AMA-member-to-family injury, and that this change removes clubs, chapters and flying site owners from such coverage as well? (See our "Airwaves" column for more on this development.) Let me know how you feel about this.

MODEL AIRPLANE NEWS
THE WORLD'S PREMIER R/C MODELING MAGAZINE

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AIRWAVES

WHERE TO WRITE TO US
If you're writing to the editors (and we'd love to hear from you), please be sure to address your letters to "Airwaves" *Model Airplane News*, 251 Danbury Road, Wilton, CT 06897. Only subscription orders and inquiries are handled by our Customer Service Department in Mount Morris, IL; other mail addressed there must be forwarded to Connecticut, and this leads to long delays.

AMA KILLS LIABILITY COVERAGE BETWEEN AMA MEMBERS

These words are from the flyer accompanying the 1991 AMA Renewal Notice:

> *"Liability protection applies only to bodily injury, and/or property damage caused by an AMA member to a* ***non-AMA*** *member."*

This quotation raises issues that I think have an impact on every AMA member, AMA Chartered Club and landowner who provides an AMA Club with a flying area. Your readers should be aware of them.

The effect on AMA members is that on and after January 1, 1991, they will be at risk in general liability for damages, court costs and attorney fees, if they inadvertently or negligently injure another AMA member during the course of their flying activities. Effective January 1, 1991, the only general liability protection provided for an AMA member is if he injures a person who is **NOT AN AMA MEMBER**. Insurance protection is no longer being provided to cover those most at risk of injury from model flying activities.

The effect on an AMA club is that it's no longer insured for general liability purposes if an AMA member is injured by a club member while flying at the club field. The club now will be solely responsible for all costs in defending any lawsuits brought against it and awards that might result. I suspect that few, if any, AMA clubs have general liability insurance policies to covers such events, except for the protection that has been provided by AMA insurance up until now. To protect themselves, clubs may be forced to obtain a general liability policy at a cost that might be extremely expensive, or to cease operations because the risk is too great.

There's also an effect on

a landowner who provides a flying site. Unless the club using the field can provide insurance protection for the landowner, it seems doubtful that he will permit flying on his land. Since AMA liability insurance is no longer available to AMA members for injury to other AMA members, and AMA members generally are the ones using the field under the banner of the AMA club, the club will be in the position of either obtaining a general liability policy for itself and the landowner, or having to advise the owner that there's no protection provided for AMA member-to-AMA member injuries. Unless an owner is assured he won't be saddled with the costs of lawsuits, I doubt that he will permit flying to continue. To do so would involve an economic and liability risk he's probably unwilling to assume.

I think the Academy's decision to eliminate member-to-member general liability coverage hasn't addressed the impact on each AMA member, AMA club and landowners. That decision should be carefully considered by all AMA members.

LOUIS M. GUERRIERI,
AMA Member 17610
San Carlos, CA

Thank you for the thoughtful letter, Louis. Curious about the AMA's position, I contacted Bob Underwood, AMA's technical director, who put me in touch with Carl P. Maroney, special services director. I asked about the basis for the change and, since I didn't see this one coming before receiving a recent AMA press release, I also asked what kind of advance notice had been given to the AMA members.

As to the need for the change, Carl cited recent lawsuits with million-dollar claims that are being defended by the AMA, and he noted that there's a pressing need to curb the bringing of suits with exorbitant claims. As well as I can tell, the high costs of defending against large suits was considered to be such a serious threat to future AMA operations that a solution had to be found, and that solution was to remove the liability protection between AMA members. In the absence of this protection, members are left with homeowners' insurance for protection against claims for lost wages, pain and suffering, or other claims not covered by the AMA's Accident/Medical insurance coverage.

As of January 1, the AMA's Accident/Medical coverage will provide up to $100,000 of coverage (increased from $7,500)—an expansion in coverage that the AMA says will benefit the typical AMA member

(Continued on page 12)

PILOT PROJECTS

A LOOK AT WHAT OUR READERS ARE DOING!

$END IN YOUR SNAPSHOT$!

MAN is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable.

All photos used in this section will be eligible for a grand prize of $500, to be awarded at the end of 1991. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to: Pilot Projects, Model Airplane News, 251 Danbury Rd., Wilton, CT 06897.

RENO RACING RED

Scratch-built by Virgil Van Bibber of San Jose, CA, from Royal plans, this racer is powered by an O.S. .61 engine and controlled by a World Expert radio. The Rom-Air retracts are in the wings, and the whole package is finished with acrylic lacquer—even the lettering is hand painted. Its all-up weight is 10 3/4 pounds, and Virgil says it's a great flying machine.

WINGS AFLOAT!

This beautiful amphibian fighter/bomber Vought OS2U-3 Kingfisher is the handiwork of P.D. Harding of Spokane, WA. It weighs 12 pounds, has a 76-inch wingspan and is powered by an ST-.75. The cockpit is fully detailed, the landing lights are functional, and it drops bombs! PD also made the scale landing gear.

SCRATCH-BUILT KIT?

Kenneth C. Erickson of St. Paul, MN, scratch-built this 1/5-scale T-28 using parts from a Pica kit as templates. The 15-pound model is powered by an O.S. 1.08 engine and finished with K&B resin and fiberglass cloth. Kenneth says it flies very realistically—but you have to enjoy white knuckles!

SUPER SAILPLANE

Jon Vance of San Diego, CA, built his 1/4-scale Roebers ASW 25 from a German kit. The 10 1/2-pound glider has a 4-meter wingspan and retractable landing gear, and it's controlled by a six-function Airtronics Vision 8 glider radio. Jon finished this model with Econocote and acrylic lacquer.

AND THE WINNER IS...

Edward J. Zemaitis of Harrisburg, PA, won $500 in *MAN's* 1990 "Pilots' Projects" contest! Ed's scratch-built Martin Mariner PBM-5A amphibian featured in the December issue is an awesome model! (See the full story in our next issue!) Congratulations, Ed!

SCALED-UP FAN TRAINER

To accommodate the conditions at his flying field, Thomas P. Conti of Guilford, CT, built this fan trainer from *MAN* plans that he enlarged by 50 percent. This 7-pound plane is 52 inches long and has a 60 1/4-inch wingspan. It ROGs in 100 feet, performs rolls and loops with ease and uses an O.S. 46 SF ABC engine for power. Using five Master Airscrew 10x6 props, Thomas made a five-blade prop. He also added a set of tricycle landing gear.

TRI-POWER KADET SENIOR

This unique plane was built by C.L. Buckmaster of Weatherford, TX. It uses three engines (two O.S. 40 FPs and an O.S. .40 SF), and when they pull together, there's tremendous excess power. The 11-pound model has aileron and rudder mixing capabilities, and its two outboard engine nacelles can be detached in a couple of minutes. C.L. says it's a great multi-engine trainer with all the Kadet Senior's excellent characteristics.

BLUE ANGEL BULLET

Finished in the Navy's Blue Angels color scheme with K&B epoxy paint, this Byron Bullet is the work of Dan Lusk of Collierville, TN. Powered by an O.S. 77/Byrojet combination and guided by a Futaba 7 UAF radio, the 9 1/2-pound Bullet has Spring-Air retracts.

AIRWAVES

(Continued from page 9)

with a typical claim. This coverage is no-fault, i.e., it's available even absent a claim by another.

Documentation sent to me as a follow-up to my call shows that discussion of the need for some sort of action on the part of the AMA regarding the liability question was discussed in the May '88 Model Aviation (page 102). There it's noted that "offering more insurance coverage than is necessary dangles a carrot in front of lawyers, who tend to go after the maximum available." The article continues that the AMA's Executive Council and Insurance Committee "are exploring further revision for 1989, to reduce the amount available per accident, to be more in line with car owner coverage."

In the December '90 issue, page 120, AMA Executive Vice President Dave Brown notes that "if we are to continue to cover everyone, everywhere, anytime, then we will eventually be forced to increase the cost of membership substantially." He notes that if the AMA offered varied sums of liability coverage to individuals, clubs and site owners, tax-exempt status could be lost, or the insurance program might otherwise be fully taxable. He continues, "In fact, I guess that if we became a taxable entity, the lowest cost of AMA membership would be in the neighborhood of $40 without any insurance benefit, and liability insurance could drive that up to hundreds."

The bottom line is that the AMA exists to serve the interests of its members. I'm not an expert on insurance or on AMA procedures, but couldn't the membership have been more actively involved in the decision? Cutting liability insurance may have been the best call, but though I'm an AMA member, I don't have enough facts to form an opinion. Are there scenarios, using AMA resources, that would permit continuation of the coverage? Should members have been polled on possible tradeoffs that would have permitted continued coverage? How high would AMA membership fees have risen, practically speaking? I argue that we at least deserve more information on the basis of the decision, as well as some meaningful input into future decisions of such central importance—after all, we're the ones whom the AMA is chartered to serve. I invite comment from the AMA and our readers.

TA

AERIAL COMBAT RENAISSANCE?

In your article "Top Gun Extravaganza" (August '89), you refer to the International Dogfighting Association (I.D.A.). I've been in R/C for some time, but I'm currently focusing on combat R/C. How can I contact this organization? Does the AMA have such a branch?

JOHN W. CLARK
Columbus, OH

John, there's a growing interest in models that chase other models. Dogfighting (some prefer the term "aerial" or "competition combat") is one of the most exciting modeling events for contestants and spectators. The goal of competition combatants is to cut a 30- or 40-foot paper ribbon that's attached to the rear of their adversaries' planes. Hundreds of people now compete in Europe, and more are getting involved in the U.S.

The AMA is now considering two sets of rules for aerial combat competition. One set, proposed by Greg Rose, restates rules promulgated by the International Dogfighting Association (I.D.A.), which is based in Norway. The I.D.A.'s approach focuses on scale dogfighting and gives you the option of using any 1935 to

1955 combat aircraft in 1/12 scale. A maximum engine size of .20 (if the original plane had a radial), or .15 (if the original was in-line) is permitted. The all-up dry weight should be 2.1 pounds (1 kilo).

To promote safety, this approach stresses highly maneuverable, light planes. The planes aren't designed to be crash-resistant: if a midair collision occurs, both planes would fall. Efforts are underway to form western, eastern and central divisions in the U.S. For further information, write: I.D.A., c/o Greg Rose, 3429 Elmy, Orion, MI 48359.

The other set of rules has been proposed by H. (Sandy) Sandford Frank, (105 N. Brazos, Weatherford, TX 76086). His proposal allows engines up to .46 size, and scale aircraft aren't required. Sandy notes that an R/C combat ship costs less than the basic C/L combat or beginner's R/C sport-pylon racer equipment and that combat competitions could promote the development of highly maneuverable, crash-resistant designs.

He says the differences in local rules (one-on-one versus multi-plane matches; restricted versus unlimited engine size; wing area restrictions and differences in scoring) point to the need for a nationally recognized set of rules. Technological improvements spawned by combat competition could benefit other areas of aeromodeling as well. Rules now under consideration by the AMA, if adopted, wouldn't be effective until 1992. TA

(Continued on page 138)

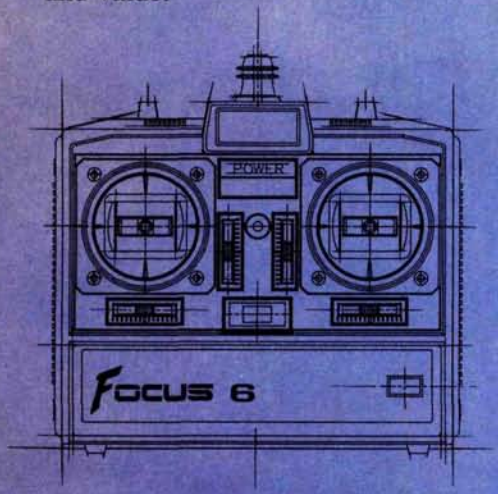
We welcome your comments and suggestions. Letters should be addressed to "Airwaves," **Model Airplane News,** 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we cannot respond to every one.

Design...

A New Starting Point

Quality begins with design. In RC, no design is more important than the one that serves the flying modeler. At Hitec, we put you in the center of our design effort. We heard all the talk about radios and the 1991 flying environment. And we listened.

With this in mind, we designed a sport radio series that is tops in performance and reliability. From form to function, the Focus Series is unsurpassed in quality and value.

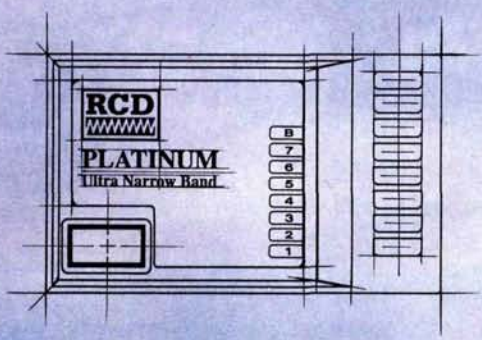


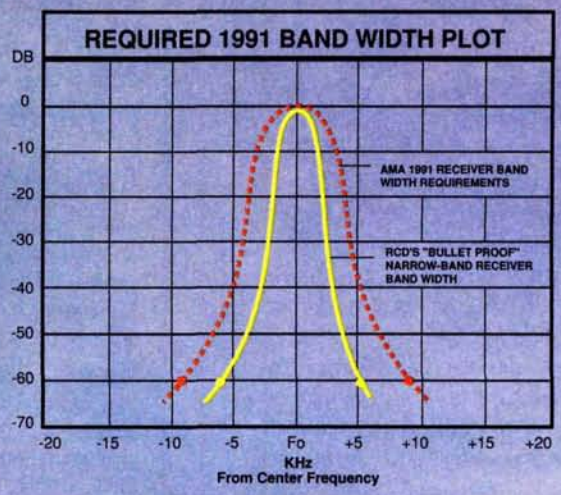
Feel the comfort of the slimline design in the Focus case. Engineered for both function and comfort, the quality craftsmanship is obvious. Pick up a Focus transmitter and you won't want to put it down.

Focus on Features

For sport flyers seeking the most bang for the buck, Focus is the answer. The Focus Four FM features servo reverse and ATV on all channels, comes standard with the 1991 RCD Platinum Receiver, is trainer capable and includes three super accurate HS-500 servos. The Focus Six FM includes four HS-500 servos and the RCD Platinum Receiver. Our Focus Four FM-E, design for moter-powered gliders and electrics, includes two HS-101 micro servos, On-Off/auto-cutoff switch and the RCD Micro 535 Receiver. All systems feature full NiCDs and Charger.

The ability to reject unwanted RF signals is the single most important feature of any RC system. Nothing does it better than the RCD's Ultra-Narrow Band Dual Conversion Platinum Receivers.



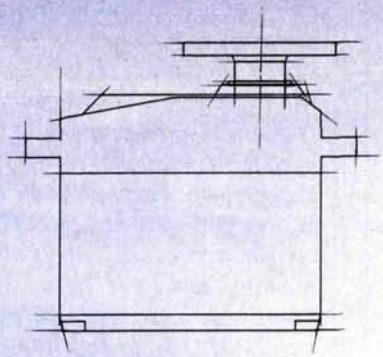


RCD is at the leading edge of narrow band dual conversion technology. RCD receivers surpass AMA guidelines and are virtually immune from stray RF signals.

Focus On Performance

There is no greater danger to the model flyer than radio interference. Stray signals, local pager systems and third order interference can spell instant disaster for you and your model. Fear no more. Focus radios come equipped with RCD Dual Conversion Platinum Receivers. Dual Conversion means no threat from 3IM. Platinum means they surpass the AMA guidelines for 1991 narrow band acceptance. When it comes to "narrow band", these receivers are the narrowest.

The HS-500 is simply the finest, most reliable standard servo available for airborne use. With iron/oilite bearing-supported output shaft, indirect drive and custom IC for 1/4 degree centering accuracy, the HS-500 assures superior tracking, long life and constant high torque.



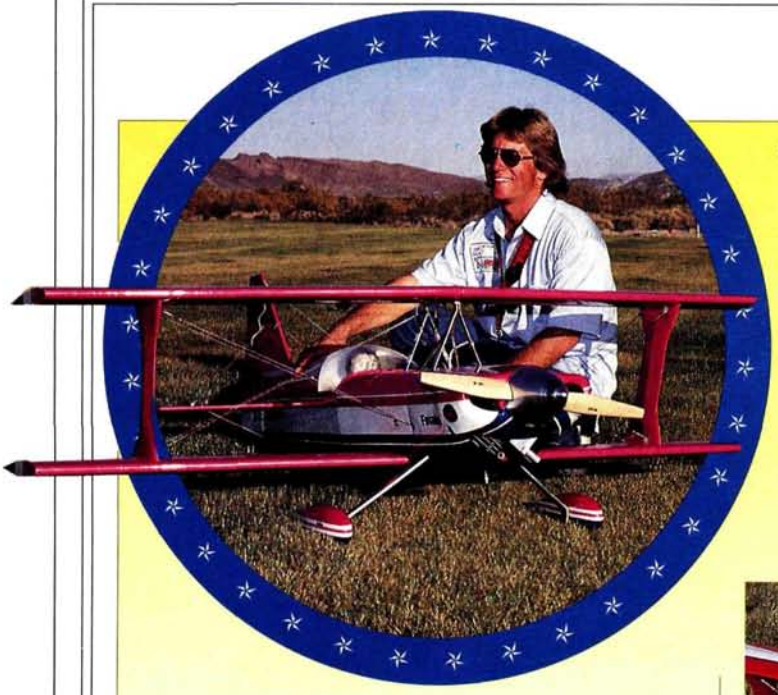
Focus On Value

There's one thing that we didn't design into the Focus radios—a price tag with a big number. That makes Focus the value leader in affordable radio systems. Come and see for yourself. The Hitec Focus Series is available at finer hobby shops across the country.

AIR SCOOP

by CHRIS CHIANELLI

New products or people behind the scenes—my sources have been put on alert to get the scoop! In this column, you'll find news that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares?—it's you, the reader, who matters most! I spy for those who fly!



Left: Chip Hyde (from the U.S.) and his Sachs-powered Ultimate took 1st place overall, while Argentina's Quique Somenzini (below) took 1st place in the 3-minute Freestyle event with his Sachs-powered Ultimate.

CHAMPION'S CHAMPIONS

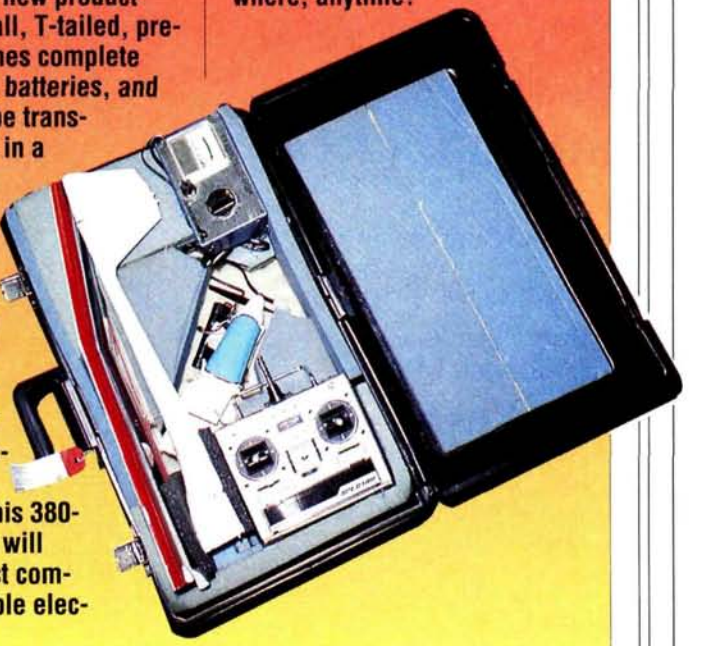
Two men flew Ultimate Bipes to victory at the 1990 Tournament of Champions: Chip Hyde of Yuma, AZ, took 1st overall, and Quique Somenzini of Argentina was top dog in the 3-minute Freestyle. With his brilliant red bipe and artful style, Quique was the people's choice. It's sad that his eminence—the smiling gentleman from Austria—Hanno Prettner, was taken ill and couldn't attend. Hanno is not only a magician with the sticks, but he's also one of the nicest people I've ever met. He was sorely missed at this year's competition, and we all look forward seeing him at the next aerial "Clash of the Titans."

CORRUGATED FLOATS

U.S. Air Core has developed a set of floats made from the same corrugated polypropylene as its Corostar 40. These flat-bottom floats are waterproof (as long as they're constructed properly), and they come with mounting struts and aluminum braces. The finished assembly is attached to the fuse with break-away nylon bolts.

You *Can* Take It With You

At the recent Chicago RCHTA show, Rollin Klingberg (aeronautical engineer and innovative manufacturer of the Klingberg Flying Wing and X-Wing Interceptor) was looking for prospective distributors for a new product concept. His small, T-tailed, prebuilt electric comes complete with charger and batteries, and it's designed to be transported anywhere in a small plastic suitcase. The prototype features a fuse (to be made of plastic or fiberglass) that's held together by rubber bands to prevent major crash damage. Inspector Klingberg says this 380-powered wonder will have the smallest commercially available electronic speed controller in the world and a flying weight of 1 pound—yes, 1 pound! Will someone market this product and fill the need for an R/C model that can be flown anywhere, anytime?



This solid-fuel motor fits into the aluminum chamber on the bottom of the fuselage. These motors are rumored to have an 11-second duration.

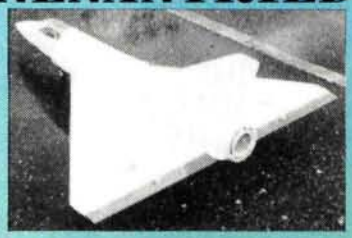
CHUCK'S CHOICE

If the exalted General Yeager were to fly a glider, this would be the one! The Aerotech Phoenix is a rocket-launched, fully aerobatic glider that can do a high-speed vertical climb to 1,000 feet. Its manufacturer claims the computer-designed airfoil produces little drag at high speeds and has a low sink rate for catching thermals. The professional-grade propellants it uses provide more than three times the performance of conventional model rocket motors of the same size. The Aerotech Phoenix sounds like a precision-made high-tech machine: I still think it should be called the Phoenix X-1, even though you don't need a B-52 to launch it! Rumor has it the company is looking for a famous enlisted man for its ad campaign; are you listening, Chuck?

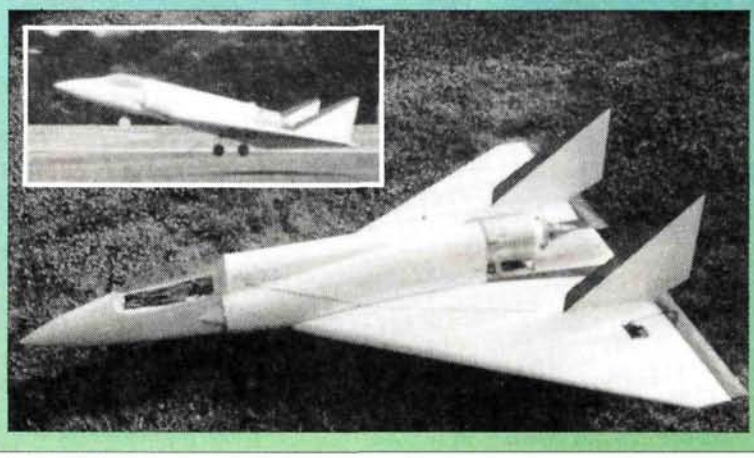
AIR SCOOP

STRAHLTURBINENANTRIEB (JET)

On May 21, 1990, the experimental Mirage 2000 Delta made its first flight at a fan fly in Denmark. The non-scale version has twin vertical stabs and an exposed FD3 engine to prevent overheating (its exhaust-gas temperatures reach 550°C!). On the original semi-scale version, the turbine was enclosed, but this design posed too many problems. I've been told that the 1/6-scale sound barrier was broken in silence.



The original prototype had overheating problems.

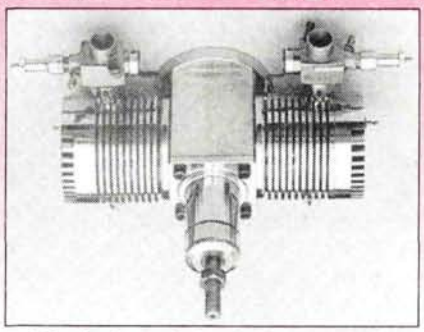


ENGLISH "SECRETE WEAPON"

This strange device has been spotted under 4-stroke engines mounted in English models. It turns out to be a film canister that's modified with a pressure fitting and a breather hole. Oil that exits the breather nipple collects in the container instead of on the airplane's beautiful finish. You have to empty the container after five or six flights. Aren't the English practical?

Vega 4-Stroke Sloggers

Although they're less powerful than engines with overhead poppet valves, Vega slide-valve engines are real workhorses, and they're more compact than other 4-strokes. The first models to be produced in England's "Midlands" are

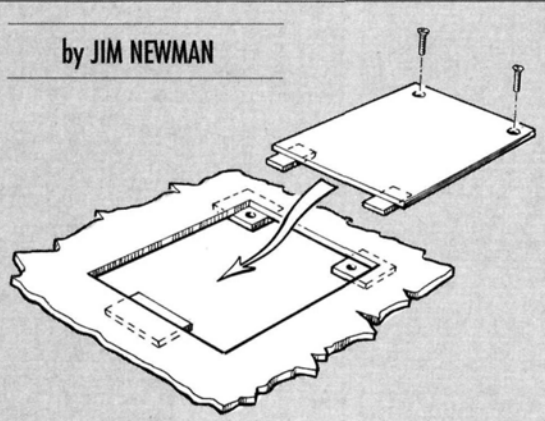


a .91 single and the 1.80 opposed twin (shown here), which weighs 38.5 ounces and is only 6 inches wide. It's not yet clear whether they'll be available in the U.S.

HINTS & KINKS

Model Airplane News will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman, c/o **Model Airplane News**, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

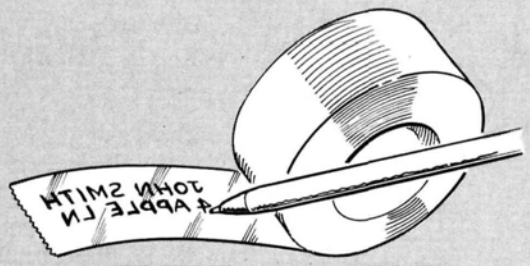
by JIM NEWMAN



FLUSH ACCESS HATCH

This hatch gives you easy access to wing-mounted servos or hidden wing bolts. It's retained by projecting tabs and a couple of flat-head screws, and it should be made of a material that's the same thickness as the surrounding sheeting. If you have to remove the hatch regularly for maintenance, use machine screws and T-nuts. Small nylon screws are even more resistant to vibration, and you can find them at most hardware stores.

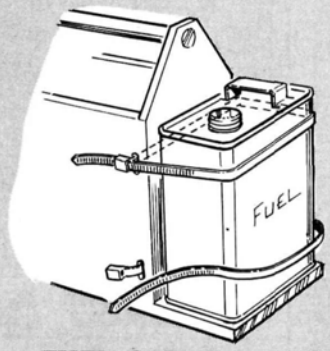
William H. Kay, Burke, VA



TRANSPARENT LABELS

You never know when your R/C model might get away from you, so put your name, address and phone number on it somewhere! Use a ballpoint pen to write the information on the adhesive side of transparent parcel tape. The trick?—write backwards! When you attach the label to the model, your address will read correctly and be protected from the elements.

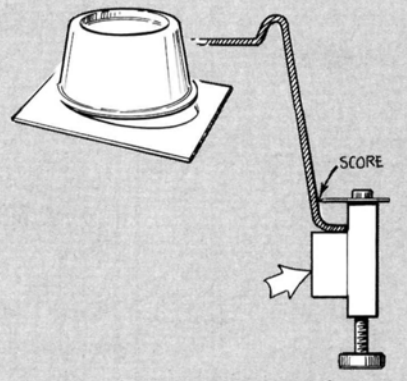
Will Sgarlat, Marstons Mills, MA



FUEL-CAN RETAINER

Here's a neat, inexpensive way to secure a fuel can to your flight box. Simply make slots in the sides of the box, and thread two, 30-inch, nylon wire ties through them. These fuelproof ties are available at Radio Shack and hardware stores.

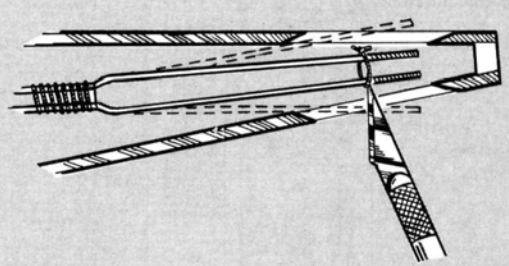
Tom McGee, Waco, TX



TRIMMING PLASTIC PARTS

Use scissors or a hobby knife to cut off excess plastic, and then set your balsa stripper to the appropriate depth. (A Master Airscrew trimmer is good for trimming plastic components.) Score the part several times, and then snap off the excess cleanly. To smooth rough edges, rub the part on a sheet of sandpaper that's taped to a flat surface.

Johann Schmidt, London, Ontario, Canada



INSERTING SPLIT PUSHRODS

Split pushrods are difficult to insert through a fuselage, but this method makes it easy. Tie the rods' ends together with a loop of thread. When they're aligned with the exit holes, simply cut the loop with the tip of a modeling knife, and the threaded ends will pop right through!

Jim Adams, Irving, TX

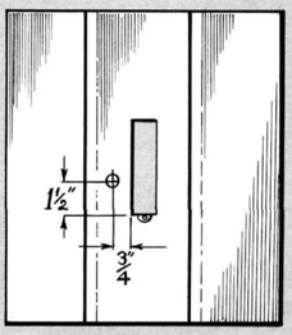
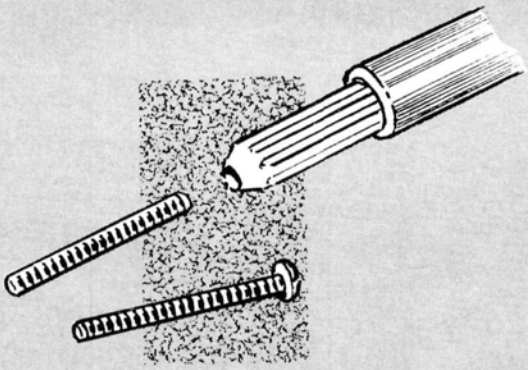


TABLE-SAW BELT TENSION

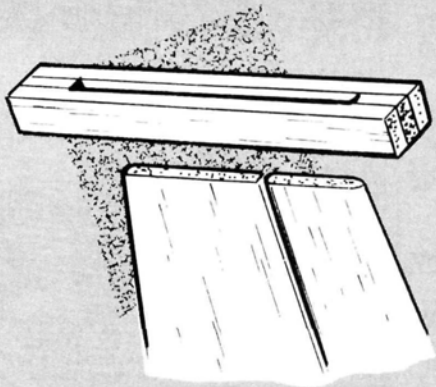
This modification simplifies belt tensioning on a Dremel 4-inch Table Saw (model no. 580-2). Mark the saw table according to the dimensions shown, and drill a hole that's 1/4 inch in diameter. Now you can use a 1/8x6-inch-long Allen wrench to loosen the adjustment screw on the motor mount. *Caution:* be sure to lower the saw blade and unplug the power cord before making any adjustments.

David S. Byrd, Johnson City, TN



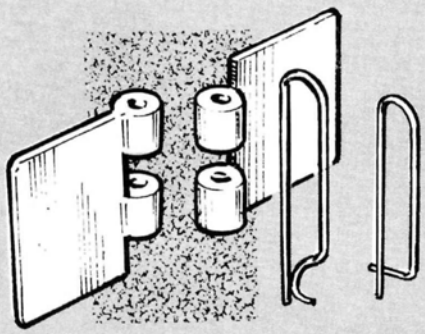
THREADED PUSHROD ENDS

If you remove the heads and file the ends of 1-inch-long, 2-56 machine screws (which are available at hardware stores), they make great threaded ends for nylon pushrods, e.g., Sullivan Gold-N-Rods.



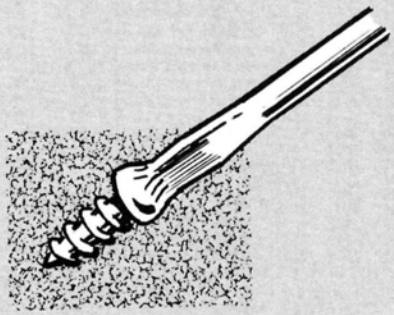
CONTROL CLAMP

You often need an extra set of hands to hold the control surface at neutral while you establish the correct pushrod length. This simple clamp, which is made of scrap balsa to fit firmly over the control surface, does the job well. Use shims to keep tapered control surfaces centered, or make a special clamp to fit them.



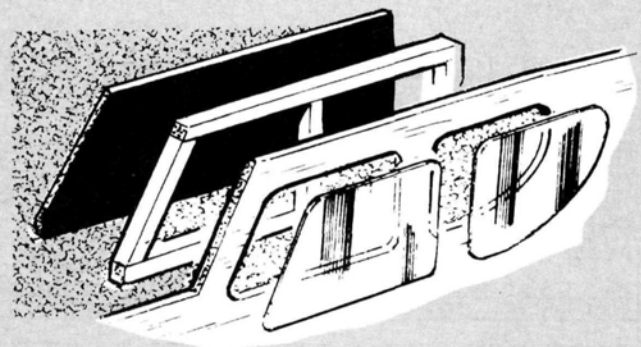
MODIFIED HINGE PINS

To have removable control surfaces without using a long hinge wire, you can use individual removable hinge pins bent like safety pins. Here are two shapes; we prefer the one on the right. The pin is a little trickier to remove, but it definitely won't come out accidentally.



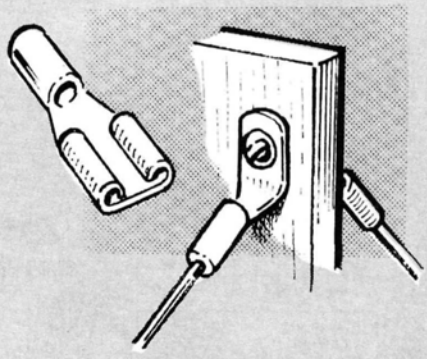
CLEVER HOLE TOOL

Solder a sheet-metal screw of the appropriate size onto an old screwdriver, and you'll have a great tool for marking and pre-threading servo-mounting holes. It's much easier than fumbling in the depths of the fuselage with a screw and a screwdriver!



BETTER CABIN WINDOWS

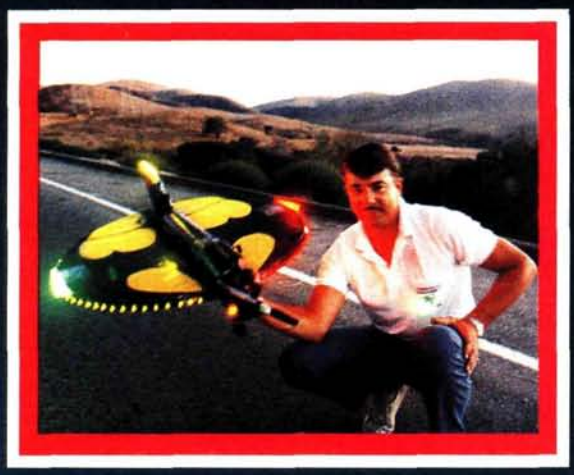
Cabin windows might look good, but on some models, they make the cabin area very weak structurally. To form a recess, apply framing inside, then glue in a doubler that's painted matte black. Windows that are fitted from the outside look great, and the structure is as strong as ever.



NEW USE FOR LUGS!

Solderless electrical lugs make great bracing-wire attachments. Just grind or file off the rolled spring sides, drill the lug to accept a bolt, and solder the bracing wire into the hole.

NIGHT FLYING



R/C fireflies and UFOs!

■ *Above left title photo: Dave Herbert all set for some night flights. The UFO is a Round-Tuit done up as the "Batplane." Lights along outside edge are LEDs that are timed in sequence.*

■ *Above: Using time exposure makes the night sky come alive with ribbons of light.*

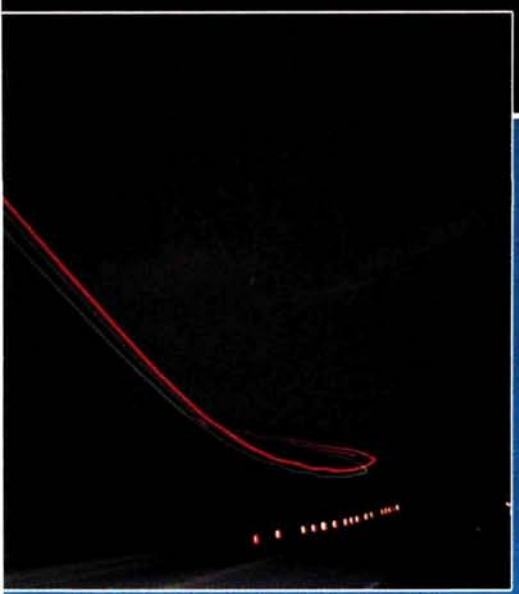
by DAVE HERBERT

I BET YOU think that anyone who flies an R/C plane at night must be crazy, but my friends and I have learned how to fly confidently in the dark, and we have fewer crashes than by day! It's true! For the past eight years, night flying has a been a once-a-month ritual for us, and we fly until the wee hours of the morning.

Are we crazy? Known as the Capistrano Aero-Dumpmasters R/C Special Effects Team, we *know* that night flying isn't as wild as it sounds. I still fly my reliable, 3-year-old, O.S. .40-powered Olympic 20L (I like to use more power than I really need).

Editor's note: Model Airplane News neither condones nor endorses the practice of night flying. The views expressed in this article are exclusively those of the author.

■ *Left: Bill Yates holds Dave's plane before night takeoff.*



A low fly-by. Note landing lights at roadside.

Loops and rolls add interest to the light show. The stars are elongated by time exposure.

PHOTOS BY BOB BRUCKER & CHARLES La CROIX

During the past year, I added "Batplane" to my nocturnal flying machines. It's really a Roun' Tuit (a round, flat-winged plane) with an additional set of lights (designed by David Schnell) to enhance its flying-saucer look. My Batplane has 25 red LEDs (light-emitting diodes) on one side and 25 green ones on the other side. These lights come on in sequence, in parallel, from the front, around the circular wing and back to the elevons.

here reached 104 degrees. The air was dead, the asphalt runway was too hot to touch or kneel on, sunburn began to bother us, and we all went home early. Since I hadn't had my weekly flying fix, I called a night-fly for Monday night.

This was one of the best yet! The sky was black and speckled with stars, the temperature was a comfortable 78 degrees and there was a slight breeze. We've seen hundreds of falling stars while

HERBERT'S LAWS! —TEN TIPS FOR NIGHT FLYING

1. *Don't fly when there's a full moon, because it's as bright as the sun, and if you look at it for some time, you'll ruin your night vision.*
2. *Wait for complete darkness; don't fly at dusk, because your eyes are still adjusting to the fading light. You need your night vision.*
3. *During all flights, have a night spotter and a spotlight person standing by to assist you.*
4. *Always start engines under light.*
5. *Always have a safety officer present to keep track of the position of all spectators and support crew.*
6. *Make sure that spectators and other pilots don't turn on their cars' headlights while you or anyone else is flying. It will temporarily ruin your night vision.*
7. *Test-fly your new airplane before dark for trim, and make sure you can see its lights from any angle.*
8. *Embarrassingly dirty, ugly airplanes you wouldn't fly during the day look great at night. Get one ready!*
9. *Don't forget to undo what you did last, and if in doubt, roll out!*
10. *Mind where you put your feet!*

The effect is incredible! Powered by a K&B, 7.5, rear-exhaust, ducted-fan engine, its speed really enhances the spectacular sight of this "UFO" against a star-studded sky.

WHY DO WE NIGHT-FLY?

I was recently reminded of the main advantage of night flying when the afternoon temperature

night flying, and the entire experience is very exciting.

Another advantage of night flying is that you can look up at your plane without squinting, or wearing sunglasses or a hat and fly comfortably and confidently.

Planes are more difficult to see during the day, so it's easier to lose them.With the modern light systems we use at night, it's very easy to tell where your plane is and its attitude.

MORE RELIABLE LIGHTS— NO BATTERIES!

I began night flying with Dave Duncan of Cox Hobbies. We used a battery-powered light setup that Dave designed and George Caldwell manufactured. Many of our planes still have these reliable lights, but technological advancements have brought us colored chemical lights that don't rely on batteries!

From BYI Distributing*, Cyalume Chemical Lights work for 12 hours and come in red, blue, green, yellow and white. Miniature lights come in green, blue, and pink and, rest assured, they'll glow for 4 to 6 hours.

We also use electric lights from BYI. They come complete with four bulbs, four lenses, wire, an assembled circuit board and a switch. The lights take 4.8 volts (DC) and come in red and green (steady wing lights), blinking red (taillight) and white strobe (belly light).

NIGHT-FLIGHT LIGHT SETUP

For the best possible after-dark setup, mount a steady red light on the left wing; a steady, green light on the right wing, and a white or yellow light on the vertical stab. Don't use blinking lights for wing tips unless you want to see your plane disappear every 5 feet. We tried it, and it was exciting, but we don't recommend it! As long as you know which color light is where, it's easy to figure out your plane's position. (We've even been coloring some of our daytime planes' wing tips red and green, because it works so well at night.)

The light extenders for the old electric lights are plastic tubes (like big fiber-optic leads) that are attached to the tiny light bulbs to make them larger and therefore more visible. For example: when flying a shallow, left turn or an oval

pattern, the green light could be obscured from your sight by the wing or fuselage, and extending it makes it much easier to see. It's important to set up your lights so that you can see them from any angle on the ground.

The 6-inch-long Cyalume Chemical Lights we use on our fixed-wing planes are attached to the wing tip and/or leading edge with clear Mylar tape. The lights each weigh only 21 grams and glow brightly enough to fly farther away at night than you would by day. In daylight, an R/C plane becomes a black spec at a distance, but at night, you can easily see its three colored lights.

To activate these reliable, virtually indestructible, chemical lights, just bend them to break a central vial that contains two non-toxic chemicals that mix to form a brilliant light. Use the lights in the same way each time you go flying. Always use red on the left wing. (Helpful tip: port wine is red and "port" means left!). As long as you know that the red light is always on the left wing, you'll never lose your plane.

Support equipment: spotlights, flashlights, 115V AC inverter (in blue box). Plenty of chemical lights.

THE NIGHT FLYING FIELD

Over the years, we've upgraded our flying site, too! Newmar Industries donated a 12V inverter that changes 12VDC to 115VAC. Our fields lacks electricity, so this was a welcome addition!

On each side, our runway is bordered with 50, no. 327 instrument bulbs that, like the inverter, are connected to a Delco Marine battery (with rope handle). The lights are just bright enough to light the runway. The 115 inverter is used to run the 115V red light that lights our frequency board.

This also provides enough power for our club meetings, plus occasional pots of chili and a color TV with VCR—all on one 12V battery and the inverter! We usually run out of darkness before we run out of power from the 12V DC inverter! (It runs chargers and soldering irons too!)

During all flights, we have a night spotter and spotlight person standing by. If something goes wrong, or a pilot needs light for a landing, he yells, and the spotlight is turned on. (It's fun to fly in the spotlight too!) Our safety officer keeps track of people. Remember, you can't see the spectators!

A flashlight is always useful, and I also have a small light on my starter and my flight box as well as a Radio Shack Headlight (a small light that's run by two pen-cell batteries and is strapped to your head). Engines are always started under light.

NIGHT TAKEOFFS & LANDINGS

These are much easier than you probably think. By day, you can see the ground and runway as you approach for a landing, but most of the pilots who bounce in by day, come in more smoothly at night. This is because, during daytime landings, your brain starts to "see" the runway at approximately 3 feet or lower. This is the time when your brain and fingers try to compensate with up- and down-elevator in an attempt to land smoothly.

At night, the runway is outlined with small lights, and you can't see exactly where the wheels touch down, but my students' landings are smooth! Why? They set up for a smooth approach, and because they don't panic when the ground approaches—they can't see it!—they land smoothly. This is true and well-documented by our group. Our fliers have had less trouble with nighttime takeoffs and landings than with maneuvers performed in daylight.

Maneuvers are the real fun of night flying: aerobatics are great, and snaps and spins are easy for the pilot, but to spectators, they're awesome jumbles of lights. Onlookers are sure you'll crash—but you don't!

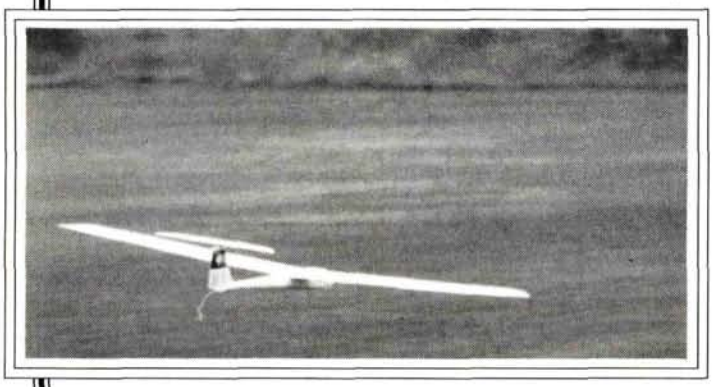
Dead-stick landings are a sight (and sound) to behold! When the engine quits on a pitch-dark night and your plane is up high, you hear only the air rushing across the wings and see the streak of colored lights before making a beautiful landing. We've had night pylon races, pattern events, fun-flys, and glider tows—all incredibly satisfying.

R/C night flying! Who would have believed it possible? I know that if you try it, you'll be hooked, and if you're near San Juan Capistrano, CA, and would like a night demo or night lessons, call me. In the meantime, happy flying—in the dark, of course!

**Here's the address of the company mentioned in this article:*
BYI Distributing Co., P.O. Box 1643, San Juan Capistrano, CA 92693. ■

SIMPROP HIGH SPEED *by Ron Farkas, Coram, NY. M: Graupner Ultra 900; P: 9x5; C: 12 (1,000 SR max); W: 68 oz.; WA: 418 sq. in. (2.9 sq. ft.); WL: 23.5 oz./sq. ft. This was built as a review kit for MAN, and it was a fast-flying crowd pleaser!*

Converted ***CGM ULTIMATE BIPE*** *by Chris True, Peekskill, NY. M: 60 Astro sport; P: 13.5x8; C: 29 (1,200 SCR); W: 172 oz. (10.75 lbs.); WA: 980 sq. in. (6.81 sq. ft.); WL: 25.26 oz./sq. ft. This model gave an impressive aerobatic performance that lasted about 3 minutes. It was built in about 4 weeks— just in time to make its maiden flight at KRC '90.*



ROBBE ARCUS *by Martin Bammert, Bern, Switzerland. M: Keller 35/6 40G; P: 11x6.5 Robbe folder Dynamic E; C: 10 (1,700 SCE); W: 66 oz. (4.125 lbs.); WA: 511.5 sq. in. (3.55 sq. ft.); WL: 18.59 oz./sq. ft. Using the Eppler 178-180 airfoil, this was perhaps the most impressive plane at KRC '90! Martin flew many high-speed inverted and rolling passes at deck level.*

SENIOR SKYVOLT *by Bob Kopski, Lansdale, PA. M: Astro 40 direct; P: 10x6 APC; C: 18 (1,200mAh); W: 90 oz. (5.6 lbs.); WA: 600 sq. in. (4.17 sq. ft.); WL: 21.6 oz./sq. ft. This is a scaled-up version of Bob's kitted and planned Skyvolt. It was a shocking performer that did outside loops and seemed capable of limited vertical flight. It's very agile and fast, and it had good penetration in Saturday's winds.*

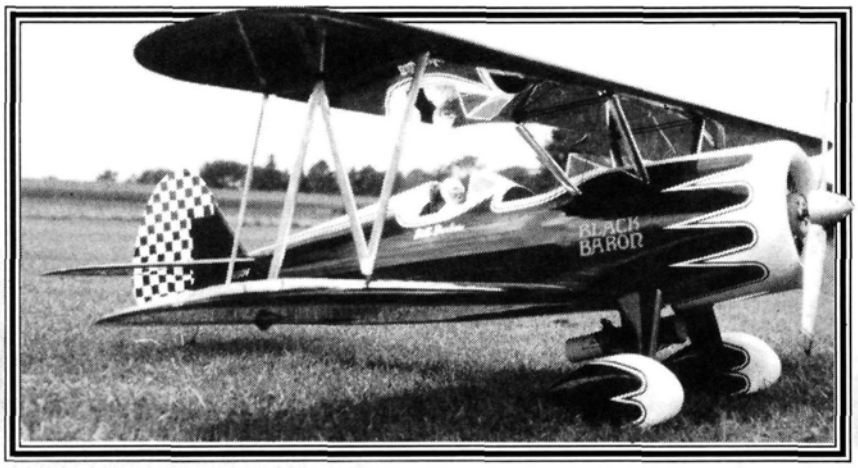
TSUNAMI *by Bob Rumsey, Randolph, NJ. M: 60 Astro pattern direct-drive; P: 12x9 APC; C: 28 (1,200 SCR); W: 146 oz. (9.125 lbs.); WA: 815 sq. in. (5.66 sq. ft.); WL: 25.80 oz./sq. ft. This Mustang kit (no longer available) was converted to match the unlimited racer of the same name. Its maiden flight on Sunday was successful; Pretna retracts.*

Key

M = Motor
C = Cells
P = Prop
W = Weight
WA =Wing Area
WL = Wing Loading

Converted ***YOGI*** *by Bill Whitehouse, Philadelphia, PA. M: 05 Astro direct-drive; P: 10x6 pusher; C: 7 (900 SR). Gene Hall started building this ship, and Bill finished it in time for Gene to see before he died. Many people in the crowd called it the "flying Cushman"!*

PHOTOS BY TOM ATWOOD & LLOYD SCHULZ



◀ ***450 STEARMAN*** *by Keith Shaw, Ann Arbor, MI. M: 60 Astro direct-drive; P: 16x8 Rev Up 7,000rpm; C: 24 (1200 Sanyo SCR); W: 144 ounces (9.5 pounds). This is a scale model of airshow pilot Bill Barber's famous plane. Keith created this plane in memory of Mr. Barber (they were close friends).*

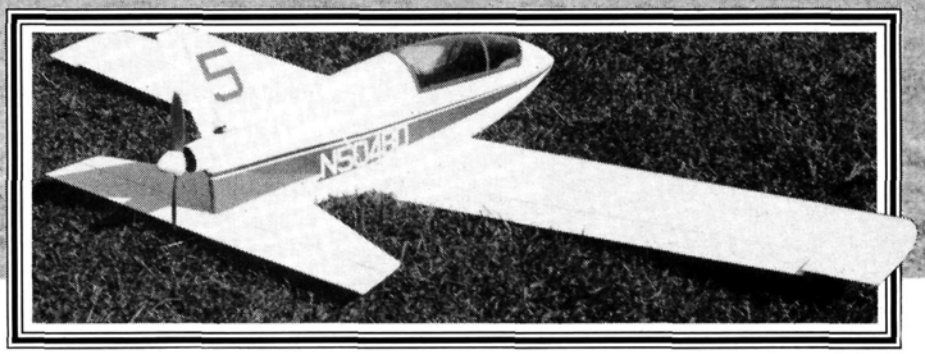
The largest electric meet yet!—everything from old-timers to a Fantrainer

11TH ANNUAL KRC ELECTRIC FLY

by LLOYD SCHULZ

▲ ***FAN TRAINER 600*** *by Ken Stinson, Telford, PA. M: 05 Astro (rewound with nine turns) direct-drive; P: three, 6x4, Cox, 2-blade pushers put 60 degrees apart on a custom-made shaft; C: 8 (1,200mAh); W: 40 oz. (2.5 lbs.); WA: 336 sq. in. (2.33 sq. ft.); WL: 17.2 oz./sq. ft. Ken slightly scaled-up MAN Fan Trainer plans to 133 percent to convert this ship to electric. It's fast and agile with good duration.*

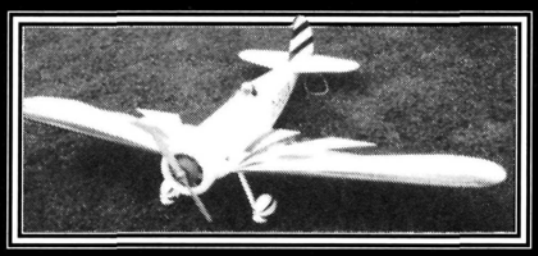
For electric fliers in the eastern U.S., the 11th annual pilgrimage to Quakertown, PA, for the Keystone R/C Club's KRC Electric Fly is a sacred date on the calendar. Held on the weekend of September 15 and 16, the KRC '90 lived up to expectations!



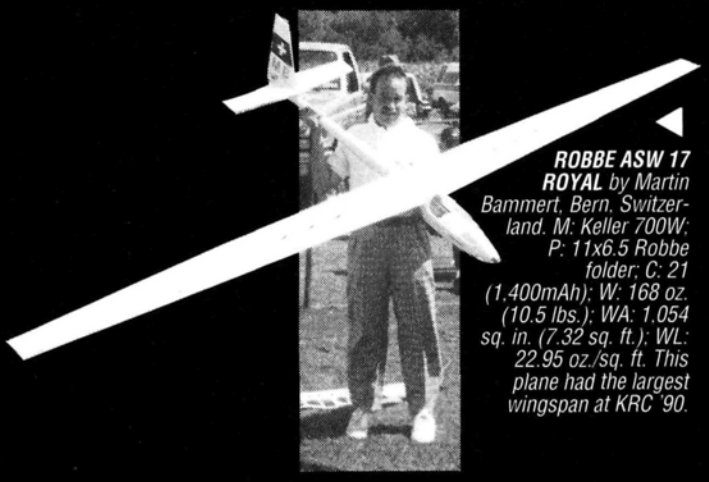
◀ ***LIGETI STRATOS*** *by Joe Utasi, Cincinnati, OH. M: Marx 300/10 (Hobby Lobby); P: 4-blade made of two 9x7 Zingers cut to 7-inch diameter and put on the same shaft; C: 16 (1,200 SR sub C); W: 88 oz. (5.5 lbs.). Bill Griggs designed this plane from three-views. Joe Utasi built its fuselage, and Walter Bub built its 52-inch span and 2-wheel bicycle gear. The original, full-scale plane was an Australian ultralight whose designer was killed a year after its debut at EAA's Oshkosh fly-in.*

▲ *Converted slope-soaring* ***BEDE 5*** *by Tony Fiore, Zieglerville, PA. M: 15 Astro direct-drive; P: 6x6 Robbe pusher; C: 12 (800mAh).*

KRC



▲ ***MESSERSCHMITT M-35*** *by Keith Shaw, Ann Arbor, MI. M: 25 Astro geared; P: 12x6-10, 7,500rpm; C: 14 (1,800 Sanyo SCR); W: 84 oz. (5.25 lbs.); WA: 630 sq. in. (4.38 sq. ft.); WL: 19.2 oz./sq. ft. This scale model of European aerobatic champion Willi Stor's 1935 and '36 contenders met an untimely end during the meet.*



ROBBE ASW 17 ROYAL *by Martin Bammert, Bern, Switzerland. M: Keller 700W; P: 11x6.5 Robbe folder; C: 21 (1,400mAh); W: 168 oz. (10.5 lbs.); WA: 1.054 sq. in. (7.32 sq. ft.); WL: 22.95 oz./sq. ft. This plane had the largest wingspan at KRC '90.*

Converted ***DeHAVILLAND TIGER MOTH*** *by Ralph Jackson, Endicott, NY. M: 60 Astro sport direct-drive; P: 15x8 Rev Up; C: 24 (1,200mAh); W: 160 oz. (10 lbs.); WA: 1,300 sq. in. (9.03 sq. ft.); WL: 17.72 oz./sq. ft. Ralph converted this Hobby Lobby kit to electric. He replaced all the plastic parts with balsa (even the cowl) and added a venturi tube and an upper-wing gas tank! It has Kevlar rigging and functional bungees, and its silk covering and overall workmanship are first class. This 2-year-old ship also flew at KRC '89.*

The KRC meet is the largest of its kind in the country. This year, there were 134 registered participants (with over 300 airplanes—a 15-percent increase over 1989!). A large crowd of spectators gathered behind a flight line that extended several hundred feet.

As always, my drive through rural Pennsylvania was beautiful, and the Keystoners had prepared a golf-green field for the event. This was the second time I arrived before 9 a.m. on Saturday and found the parking lot nearly full and the flight line already humming.

SATURDAY

In Saturday morning's wind, only a few brave souls chanced flight. Keith Shaw flew his Hyperon, Spitfire, deHavilland Comet and Messerschmitt, and Bob Kopski also did a fine job with his aerobatic Senior Skyvolt. Beyond that, there was little activity except for a few Electro-Streaks, which seemed less affected by the wind (because of their excellent penetration?—or expert pilots?).

With so little flight activity, everyone was busy talking shop, touring the pits, taking pictures, etc. Of particular interest was the Ni-Cd battery seminar conducted by Larry Sribnick of SR Batteries*. Forty people attended this informative session. (I counted over 60 at one point on Sunday!). It's good to see someone from the commercial side of our hobby helping enthusiasts with the finer points!

It has been suggested that one reason for the success of the Experimental Aircraft Association's Oshkosh, WI, fly-in is the quality of its seminars and workshops and its overall educational nature. It would be great if more experts in our hobby helped in this way.

Saturday afternoon was windy, too, but Keith Shaw again set the pace with his smoke-equipped Stearman and another run with the 100mph-plus Hyperon. At about 3:30, the wind had decreased, so many fliers ventured forth, including David Hyatt with his Kalt electric helicopter. Held in the Shelly, PA, fire hall, the Saturday evening KRC dinner was sold out; 140 people attended.

▲ *Scaled-up, converted* ***MAJESTIC MAJOR*** *by Bill Althauser, Richmond, KY. M: 40 Astro geared; P: 13x8; C: 18 (1,200 SCR).*

Tesla's ***REVENGE*** *(converted Sig Senior) by Jim Duckworth, Warner Robbins, GA. M: 40 Astro geared; P: 13x6-10; C: 14 to 28 (1,200mAh); W: 124 oz. (7.75 lbs.); WA: 1,400 sq. in. (9.72 sq. ft.); WL: 12.75 oz./sq. ft. Jim built this 80-inch spanner after seeing Everett Rubendunst's clear-covered, converted Senior at KRC '89. This 1-month old ship flies well and has a beautiful covering and color scheme.*

▲ Converted **KLINGBERG WINGS** by (left) David Baron, Roxbury, CT. M: 035 Astro Cobalt; P: 7x3 mounted on custom hub that reduces diameter to 6.5 inches for added speed; C: 6 (800mAh SCR); W: 2lbs., 3 oz. Prop is connected to inboard motor via 6.5-inch bearing-mounted shaft. Bill Griggs (right), of Westmoreland, NY. His wing: M: 05 Astro cobalt; P: 7x4 cut down to a 6.5x4 pusher; C: 14 (800mAh, 7 & 7 in parallel). Following Klingberg's recommendations, Bill designed the power pod.

▶ **KALT WHISPER** helicopter by David Hyatt, Exton, PA. M: Mabuchi; C: 8 (1,100mAh); rotor diameter: 37.5 in.

◀ Converted **DYNAFLITE P-51** by Tony Fiore, Zieglerville, PA. M: 60 Astro direct-drive; P: 14x8; C: 24 (1,200mAh); W: 148 oz. (9.25 lbs.). The easy Supra mechanical retracts (driven by an S136 Futaba servo) were installed after the plane had been finished. It has excellent penetration and a very scale-like flight.

SUNDAY

Sunday dawned clear and calm—the meet's best flying conditions—but by mid morning, there were light winds. Keith Shaw had what must have been one of his worst days in years! He lost his Aero Commander twin *and* his Messerschmitt during demonstration flights. You could sense the crowd's sympathy for him. Once again, David Hyatt's helicopter flying was as impressive as his Kalt electric chopper!

After the Maxi Flight had finished, all the awards were announced, and the field was closed at 3:30 to end another memorable KRC Electric Fly!

▼ **TWO SCOOPS** by Dave Burt, Indiana, PA. M: 25 Astro geared; P: 15x12 Master Airscrew; C: 14 (1,700 SCE); W: 72 oz. (4.5 lbs.). Dave designed this plane and used 25-year-old, 133-inch-span wings that were originally imported from Germany.

KRC WINNERS

SATURDAY

Flight Contests

All-up/Last-down	Russ Pribanic	21.01 minutes with an Olympic II
Most Rolls	Keith Shaw	47 rolls with a Hyperon (beat record of 46)

Static Contests

Best Kit Trainer	Joe Pasquito	Mirage 550
Best Old-Timer	Don Belfort	Viking
Conversion	Chris True	Best Gas-to-Electric Ultimate Bipe
Pilots' Choice	Bob Rumsey	Tsunami

SUNDAY

Flight Contests

Best Kit Aerobatic	Ron Farkas	Simprop High Speed
Most Loops	John Liberg	24 (beat record of 23)
Maxi Flight	Dave Baron	39.29 minutes (total) with an Olympic II

Static Contests

Pilots' Choice	Martin Irvine	Heinkel 219
Most Imaginative Kit	Bob Rumsey	Electric Cub
Fastest Aircraft	Keith Shaw	128.28mph Hyperon (fastest round, 132.34mph)
Best Kit Sailplane	Richard Graves	Astro Challenger

**Here are the addresses of the companies mentioned in this article:*
***SR Batteries, Inc.,** P.O. Box 287, Bellport, NY 11713.*
***Leisure Electronics,** 22971 B. Triton Way, Laguna Hills, CA 92653.*
***Rev-Up;** Progress Mfg., P.O. Box 1306, Manhattan, KS 66502.*
***Jomar Products,** 2028 Knightsbridge Dr., Cincinnati, OH 45244.*
***Sanyo Electric,** Battery Division, 200 Riser Rd., Little Ferry, NJ 07643.* ■

▼ **CURTISS SEAGULL** by Ellis Grumer, Phillipsburg, NJ. M: 40 Astro geared; P: 14x8; C: 21 (900mAh); W: 144 oz. (9 lbs.); WA: 1,349 sq. in. (9.37 sq. ft.); WL: 15.37 oz./sq. ft. Very scale-like, majestic flight.

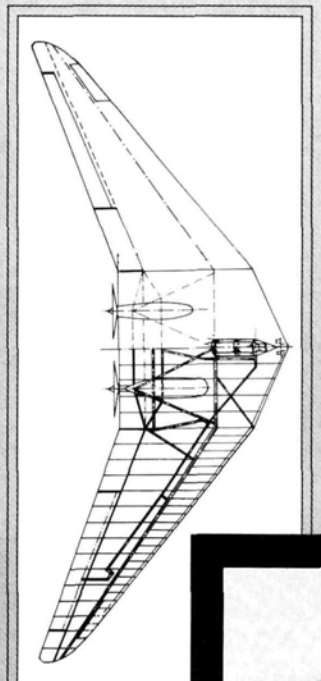
ON THE WING

by TOM ATWOOD

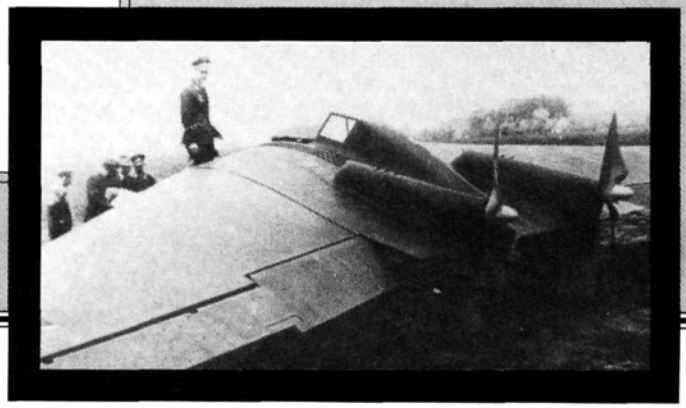
Keith Shaw's scratch-built pure flying wing King Crimson—always wows the crowds with its majestic flight. Its origin?—the impressive work of Walter and Reimar Horten, who began building high-performance, full-scale flying wings in Germany in the '30s. Keith's electric was adapted from a three-view of a Horten four-engine bird that was never built. Many Horten sailplane and powered-wing designs *were* built, including twins and at least one six-engine ship. (See the drawing and the photo of the HVc; courtesy of Nurflügel, H. Weishaupt Verlag, Graz.)

Keith's wing has a 10.5-foot span, it weighs 10.5 pounds, and it has a 2,000-square-inch wing area (for a wing loading of 12.1 ounces per square foot). Four Leisure* ferrite 05s, each driving a 10x8 wide Rev-Up* prop at about 6,500rpm, easily push the plane into the air. All are controlled by a single Jomar* SC6 speed controller, and power is provided by 28 Sanyo* 1200mAh SCRs. (Note the retracts in the photo.)

Keith points out that the Horten designs' aerodynamics and their wings' nonlinear geometric twist differ from those of the Northrop designs of the same era. To perfect his wing design, Keith translated the applicable Horten technical writings and performed the calculations. He notes, "The Horten brothers did use slightly cambered airfoil sections (about 1 percent camber), but I found the symmetrical airfoil just perfect for this, and there's no reflex to it. It's a nonlinear washout that you have to calculate stage by stage. The airfoil is an NACA 0012 that's 12 percent symmetrical."



The internal structure of the built-up wing includes crisscrossed balsa braces for rigidity. "Flying wings, especially swept wings, have to be incredibly stiff. A lot of work went into this to get a rigid structure." The plane flies impressively and will roll and loop. What show-stopper will Keith come up with next?



PHOTOS BY RICH URAVITCH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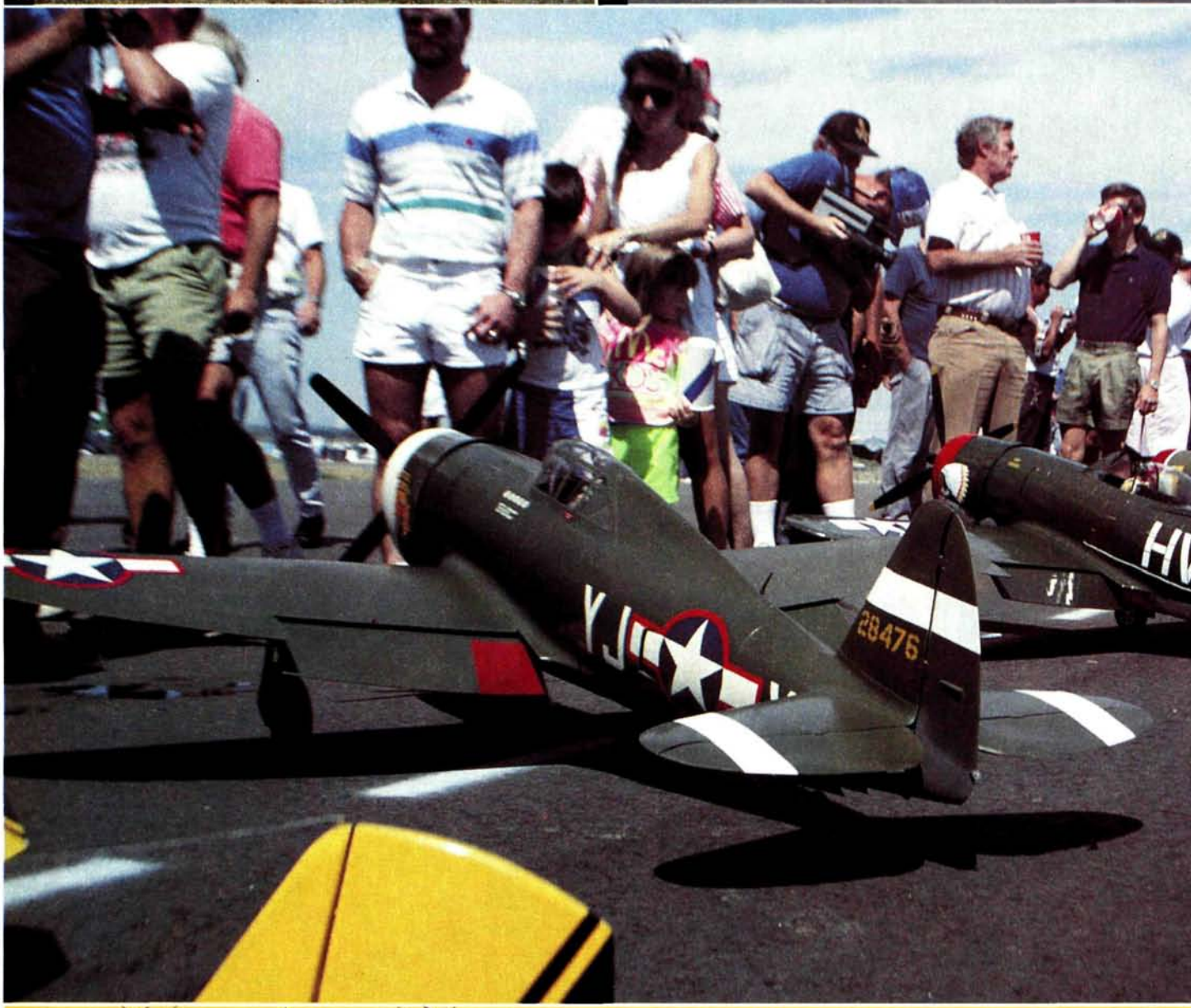

Above: A line-up of P-47 Thunderbolts surrounded by an admiring crowd.

by RICH URAVITCH

U.S. Scale Masters

1990

Regional winners do battle at the grand finale

3.

4.

•(1) Dennis Crooks performs a final flight-control check before launching the SR-71 Blackbird on a demo flight. •(2) Part of the WW I contingent (l to r): Bob Hanft's Nieuport 28, Dick Hansen's Albatros D.Va and Tom Kozewski's scratch-built Fokker D-VII. The Nieuport and Albatros are from Proctor kits. •(3) It didn't fly, but we were all waiting. Jerry Burpee's nicely finished, small twin Beech E-18 was powered by a 4-stroke. It received a 90.5 static score. •(4) An understated masterpiece—Gerry Garing's Travel Air 4000. It's hard not to be impressed by such a well-detailed biplane. •(5) No, this isn't a U-Control Nieuport! Dick Hansen performs a crowd-pleasing, in-close demo flight. •(6) The F-4J Phantom built by Shailesh Patel from the Jet Model Products kit.

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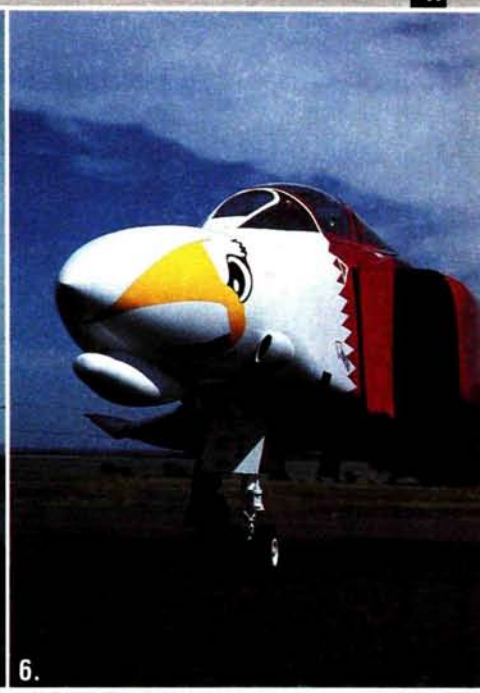

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• (7) Gene Job's 2nd-place Mitsubishi A6M5 Zero on final. Its 94.5 static and a pair of 94.25 flights were tough to beat.• (8) Scott Foster's P-47 on a fly-by. Rebuilt and refinished since last year's competition, it flew well and finished 25th. • (9) At intermission, spectators were allowed to inspect the models and ask the builders questions. • (10) Diego Lopez's A-1 Skyraider about to touch down. The three Skyraiders all finished in the top 10.

•(1) Flier, builder, traveler and emcee extraordinaire Digby Cranke flew a D.H. Moth beautifully under adverse weather conditions. •(2) Mike Winter entered his Tiger Moth complete with his "Signature Model" cockpit figure. Note the vertical whip antenna. •(3) Bert Baker, co-founder of the event, must have enjoyed seeing all the P-47s built from his kit. Scott Foster's (shown here) was one of the nicest. •(4) Ron Gilman's F-86F Sabre. Gilman won the Top Gun Invitational and placed 9th at this meet; Masters-level scale competition is tough and getting tougher!


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WHY DO DEDICATED scale-model builders, who spend countless hours working on their replicas, risk flying them competitively in what are often less-than-ideal conditions? That question must have puzzled the huge crowd of spectators at this year's 11th Annual Scale Masters Championships. R/C scale modeling is the most demanding segment of the hobby, and that's what makes it so exciting.

THE ROAD TO THE MASTERS

Each year, 20 "qualifiers" are held across the country, and the top five finishers in each are invited to compete in the Scale Masters finals. The maximum number of potential competitors is 100, but some aren't able to attend, so the number of finalists is often between 50 and 60. This year, the appeal of the Southwest must have been too much to resist; 70 of the 76 invitees showed up for the finals in Irving, TX!

This year's championship was hosted by the Mid-Cities R/C Club which, with the help of other area clubs and co-CD's Ernie Harwood and Ed Newman, did an outstanding job of making it run smoothly. Static judging took place on Thursday (September 20), indoors at the Holiday Inn headquarters, and the following three days were dedicated to flying.


The cockpit of Gerry Garing's beautiful Travel Air 4000 is typical of Masters-level craftsmanship.

NEITHER CLOUDS, NOR RAIN...!

I arrived at the North Lake Park flying site around noon on Friday and wondered where all the great Texas sunshine had gone. The day was gloomy, grey and overcast, but the first round of flying took place anyway. The usual jitters resulted in some mishaps, but gradually, everyone seemed to calm down in anticipation of the improved weather that had been forecast.

As you'd expect, everything from WW I fighters to the latest jets was represented, and each was a remarkable replica of a full-size airplane that, in many cases, still exists. Of the 70 entries, four were WW I vintage, 25 were civilian craft, and the greatest number

The winner—and deservedly so—Charlie Chambers. You'd have to go a long way to find a tougher competitor and a nicer guy.

(38) were always-popular warbirds. There was a surprisingly small number of jets—Ron "Top Gun" Gilman's F-86, Shailesh Patel's Bicentennial F-4 Phantom and Joe Grice's F-16 Viper.

Saturday morning arrived, and I was convinced that event co-founder Harris Lee was connected to a higher authority! The sun was shining brightly; the big thermometer/clock on the bank across the street told me it was 75 degrees at 7:30; and the tree branches gave only a hint of a breeze. Perhaps I would get to use all the color film I had brought after all! At the field, the attitude of nearly everyone—especially the competitors—was as improved as the weather, and some of the best flight scores of the meet were recorded.

MASTER CLASS IN SESSION!

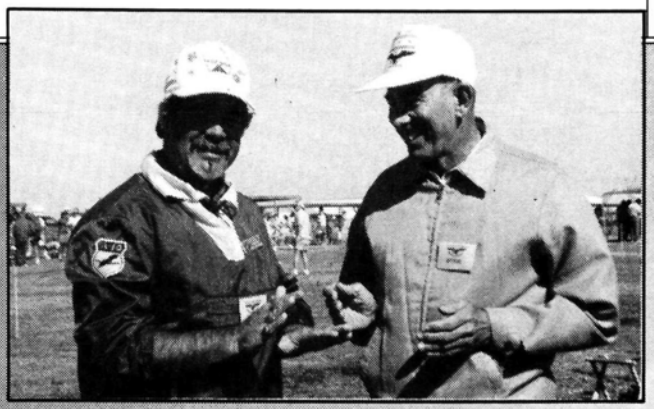
At lunch time, all the models were lined up in the center of the runway so that the spectators could view them up close. Techniques that many of us take for granted became the subject of questions posed to the builders. "How did you make all those rivets?" "Was the real airplane as dirty and faded as your model?" "Is that a *real* jet engine in there?" If you could have taped all the questions and answers, added some good photography and put it all between two covers, you'd have had a scale modelers' bible! Remember, this is the Scale Masters, and these guys are the best in the field.

THE WEIRD & WACKY

If you like superbly detailed models and unusual subjects, you wouldn't have been disappointed. Unique techniques

PLACE	NAME	AIRCRAFT	FINAL SCORE
1	Charlie Chambers	P-51D Mustang	188.58
2	Eugene Job	A6M5 Zero	186.83
3	Hal Parenti	Ryan FR-1 Fireball	186.50
4	Cliff Tacie	Savoia SM-791	85.33
5	Diego Lopez	A-1E Skyraider	185.25
6	Jeff Foley	A6M3 Zero	184.83
7	Gene Barton	AD-6 Skyraider	184.58
8	Mel Whitley	Hawker Sea Fury	184.50
9	Ron Gilman	F86F Sabre	183.75
10	Richard Lewis	AD-6 Skyraider	183.16
11	Willi Carper	P47G Thunderbolt	183.08
12	Bob Hanft	Nieuport 28 C-1	182.83
13	Charlie Nelson	Waco VKS-7F	182.58
14	Bill McCallie	P40N Warhawk	182.41
15	Shailesh Patel	F4J Phantom	182.16
16	David Hayes	Rockwell Ag-Thrush	181.66
17	Wayne Siewert	Mooney PFM 3200	181.50
18	Linton Keith	AICHI D3A-1 DB	180.91
19	Dick Hansen	Albatros DVA	180.75
20	David Pape	Kinner Sportster	180.58

"FLYING" In Its Simplest Form!



Just who are these guys, and what are they discussing?! I'm on the left, and on the right is none other than Phil Oestricher. To save you high-performance people a trip to the library, Phil is what you call an "experimental test pilot" par excellence. On January 20, 1974, he flew the first General Dynamics F-16.

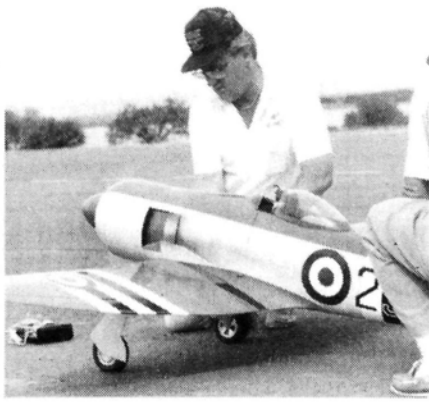
Like a lot of full-scale airplane pilots, Phil is also an aeromodeler and has been one for years. He admits to being somewhat in awe of contemporary scale models and the advances that have been made in the hobby. Phil is a long-time reader of *Model Airplane News*, and the "Fifty Years Ago" column in the August '90 issue sparked some of his fond memories. The topic of our discussion?—the finer points of fly-powered models!

I've never tried it, so I sought Phil's solution to one nagging problem: how do you get the fly to stay still long enough to attach it to the airplane? Fair question, right? I just knew the Director of Flight Test at General Dynamics would have the answer, and he did:

"Catch the fly, put it in a bottle and stick the bottle in the refrigerator! It seems that flies react to the cold like humans do, and their metabolism slows. When it's docile enough, attach the fly to the plane, wait for it to warm up and stand back!"

Now, if I can just stuff that 5-pound fly into this glass jar...!

Charlie Chambers' P-51—"Big Beautiful Doll"—on a takeoff roll. It looks like the real thing, doesn't it?



Mel Whitley's 4-stroke-powered Hawker Sea Fury had one of the nicest sounds of any entry. He flew it convincingly to 8th place.

abounded at the Scale Masters. Consider winner Charlie Chambers' P-51D Mustang, for example. Like many other scale modelers, Charlie discovered that if you're finishing a replica of an aluminum-skinned airplane, you can experiment with silver paint and coating until Madonna joins a convent, and it still won't look like aluminum. So how did he solve the problem?—with thin, aluminum sheet, that's how!

Want to gain multi-engine points without having to deal with engine-out, assymetrical thrust problems? Try a Cessna O-2 in-line twin, or better yet, choose a Ryan FR-1 Fireball, as 3rd-place winner Hal Parenti did. A .90 swinging a prop up front and an RK-740 ducted fan in the fuselage provided a very convincing representation of this mixed-propulsion airplane.

Along more conventional lines—but equally impressive—was the 1/3-scale J-3 Cub that Glen Roberts brought all the way from South Africa. Glen was one of only three competitors to receive a perfect score (30 points) in the Craftsmanship portion of the static judging. (The other two were Charlie Chambers and Rick Lewis for his AD-6 Skyraider.) The detail on Glen's Cub simply had to be seen to be believed. His efforts helped him to finish in the top third of the field.

Bob Benjamin made history at this year's Scale Masters by flying his electric-powered Porterfield Collegiate in the competition. In spite of wind conditions that favored the larger, glow or gas-powered entries, Bob flew the full four rounds and did an outstanding job. His lunch-time demo flights of an electric-powered sport model introduced this form of propulsion to many and convinced others that electrics offer some advantages.

• Far left: Skip Mast's beautiful C-130 fell victim early on.
• Left: Rich Irwin's once-gorgeous Bucker lies forlornly among the trash bags.

GRAVITY CAN BE UNKIND!

It always hurts to lose an airplane, whether it's the sport model that you've flown for three seasons or a brand-new bird. The first you miss because it was your favorite and you knew its every quirk, the second, because all you can do is fantasize about how great it might have been!

If you think losing your latest ARF would be traumatic, imagine how Skip Mast and Rich Irwin felt when their Scale Masters entries crashed to earth. Skip's C-130 Herky Bird is probably repairable, but judging from the final "hangar" of Rich's Bucker, it's unlikely that it will ever soar with the eagles again.

The causes are as plentiful as the crashes themselves: equipment failure, radio interference, stick-grip actuator malfunction...! Crashes hurt, but they happen; no R/Cer is immune to gravity. On the positive side—if we never crashed, we'd never build anything new, and exciting scale events like the Masters and Top Gun would have no reason for being!

BEST OF THE BUNCH?

After spending four days with the models and their builders, did I come up with a personal favorite? I could develop 70 categories—like the Oscars—and each would be my "favorite."

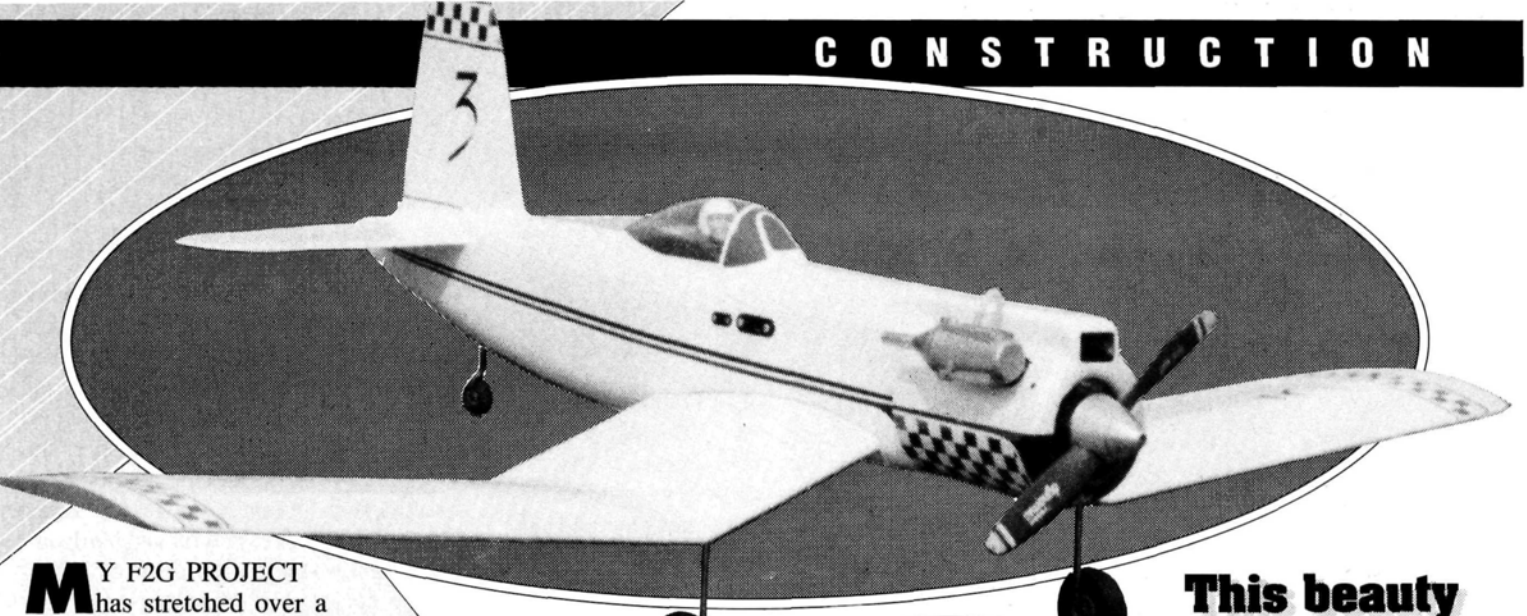
Caller Frank Tiano and flier Brian O'Meara use the universal hand-signal system to explain to the judges how low the inverted pass will be. Frank is shorter, so it appears that the roll will be lower!

- Best Classic—Dave Lovitt's Northrop Gamma
- Best Domestic Vintage Biplane—Gerry Garing's Travelair 4000
- Best Obscure Fighter— Jim MacDonald's Vickers Jockey
- Best Model of a Natural-Finish Curtiss Monoplane— Tommy Weemes' Hawk 75
- Best Cessna Airplane That Would Probably Score Even Higher If It Were Finished in Camo—Gerry Fingler's L-19 Bird Dog

See what I mean?

All the entries were outstanding, and I would be hard-pressed to select *one* favorite, but Mel Whitley's Hawker Sea Fury would be right up there. I don't know whether it was the great sound of its opposed, twin 4-stroke, the way it ran on the mains before cleanly lifting off and climbing straight out before starting its turn, or simply its crisp, sharp appearance, but something about it sure grabbed—and held—my attention!

Newcomers to R/C scale might think, "I could never build something that nice." That attitude is understandable—but remember that *all* the models competing in the Scale Masters got there by winning a local contest just like the ones you probably enter now. Sure, things get tougher when you reach the championships in any competition, but that's what makes winning so great. Ask any of these competitors; all it takes is time, interest, motivation and, in the case of Charlie Chambers, lots of aluminum litho plate! ■



F2G

This beauty combines Formula 1 specs, quarter-midget style and Quickie 500 power

by AL CULVER

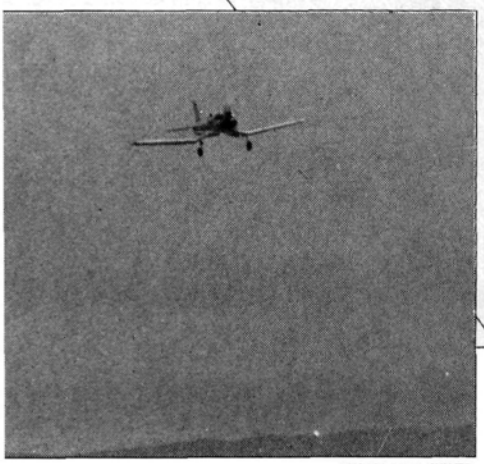
MY F2G PROJECT has stretched over a number of years, and I still enjoy it. I've built several in various sizes and for a variety of purposes, but I hadn't previously built a scale version. This one has been particularly enjoyable to make, and it always attracts attention at the flying field. It's based upon the Goodyear-built F2G, which is a racing plane with a Corsair airframe that's modified to take a bubble canopy and powered by a Pratt & Whitney R4360 engine.

A few years ago, there was a "push" in my area to include the Formula 1-40 event in our pylon circuit, but the lack of diversity in Formula 1 airplanes prompted us to look, instead, at a mixture of rules. We decided on Formula 1 size and weight, quarter-midget airplane diversity and Quickie 500-type engine and fuel. The F2G meets these criteria. It's easy to build and fly, but it isn't a "ho-hummer." It flies well with any .40-size engine and, in spite of its frontal area, it will run as fast as most Quickie airplanes when it has my Rossi engine up front.

The F2G's construction is straightforward and similar to that of most normal trainer/sport aircraft. Its fuselage is a basic box with the corners sanded off and wood added to allow a smooth contour between the deck and the belly. Before assembling the tail group, tack-glue the tail-cone blocks and insert scrap 3/16-inch fillers before sanding. Assemble the tail wheel before you glue the bulkhead into the fuselage. The aft end of the fuselage is wide enough to take both rudder and elevator horns. Glue the vertical stabilizer to the horizontal stab, attach the pushrods, then assemble the empennage.

SPECIFICATIONS

Type	*Fun-scale, warbird racer; sport model*
Span	*49.5 inches*
Weight	*5 pounds*
Length	*38 inches*
Wing Area	*460 square inches*
Wing Loading	*25 ounces per square foot*
No. of Channels Req'd	*4*
Power Req'd	*.40 to .45*



PHOTOS BY AL CULVER

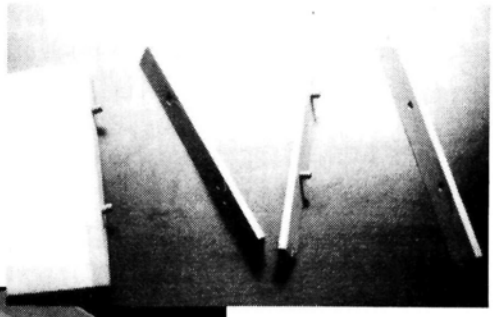
ENGINE-MOUNTING TIPS

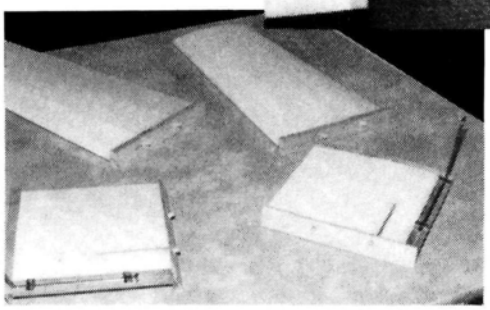
I use the Foremost 40 mount because it makes the inside of the cowl neater, and it contributes a lot to the airplane's speed. By tapping the bottom and sides of the mount and using aluminum-tube spacers, you can also mount the cowl easily. The cowl can be laid-up over a foam mold, and the foam can be removed afterward. The only compound curves are the leading-edge radiuses, so you can make a simple former and sheet-wood cowl. Make an air duct in the top of the cowl by putting a small, 1/32-inch plate in front of the engine to form the floor of the air intake. This forms a pressure cowl that forces air over the engine head (see plans) and enhances engine cooling.

WING CONSTRUCTION

At first glance, the wing may look more complicated than it really is. The wing does require the use of a full-size tilt-arbor table saw. My

F2G





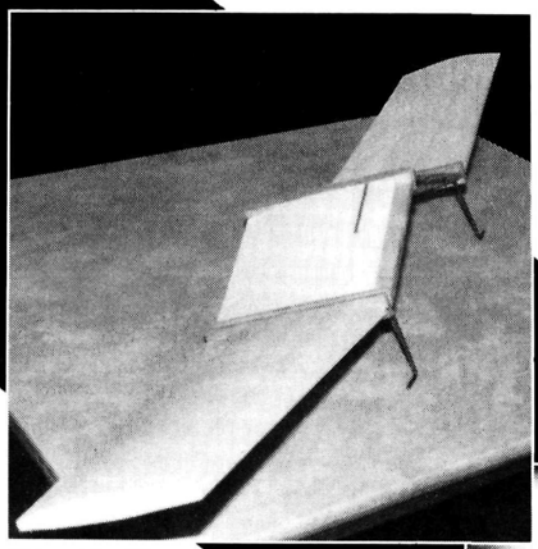
Top right: the block-core assembly sequence. Right: the roughly assembled wing cores and blocks.

little Dremel tilt-arbor saw was good enough. The secret to success with the wing is to carefully measure and cut the two angles correctly on the dihedral blocks. The four center-section blocks are the same; but the inboard ones are inverted relative to the outboard ones (see plans).

To cut foam wing-cores, I prefer to use the double-template method. If the core block is taped down with double-sided tape, there will be less distortion when you cut. Cut the top contour using the "male" top template (which is replaced by the bottom female template), and cut the lower surface with the core block still in place. The more slowly and colder your cut can be made, the more accurate and smooth the core will be.

Tack-glue the dihedral blocks together with the bottoms lined up, and label them so they won't be mixed up. Drill the guide-pin holes in the blocks, and be careful to position the pins so they'll remain under the final contour of the wing and close to parallel. Up from the bottom of each, draw a reference line at $^4/_{10}$ inch. Here, it's necessary to remember that the center-section blocks have a different bottom. Separate the blocks, and use 5-minute epoxy to glue them to the wing-cores in alignment with the chord plane. Also, install the hinge spar, the landing-gear blocks and the ply plate that take the gear-torsion loads. I temporarily install the gear wires and related hardware at this point so there's less chance of making the gouges and dents that make finishing more difficult. Block-sand the assemblies to the wing-core contours, clean carefully, and skin the individual sections.

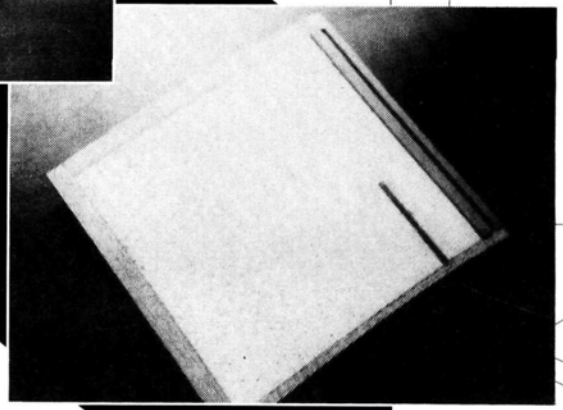
Now assemble the wing. If your pinholes are tight and you didn't over-sand the cores, the fit will be nearly perfect and easy to accomplish. I start with the center section and work out in both directions. Glue the leading edge next. If you scarf the joints, they'll be as strong as a single piece of wood.

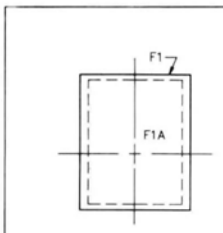


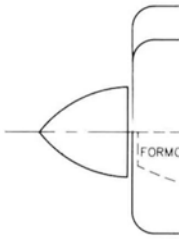
Above: a test fit.

Right: the blocks are sanded to the core's contour and the parts fitted.

Right: the landing-gear components and the rear-spar installation.

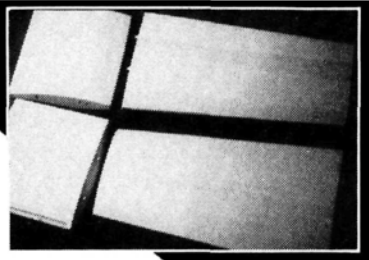




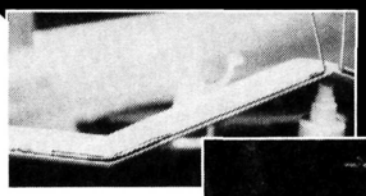


AILERON TORQUE RODS

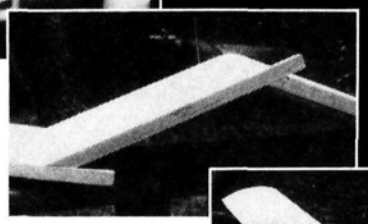
Make and install the aileron torque rods. This type of torque rod is uncommon, but trust it; it works well. Over the years, I've used it in several



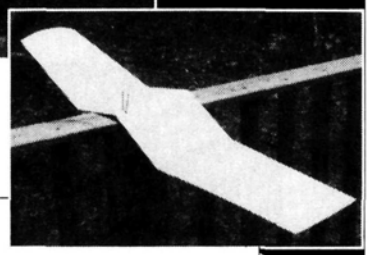
Left: the parts after sheeting. Below: the installed aileron torque assembly.



Below: the leading-edge scarf joints.



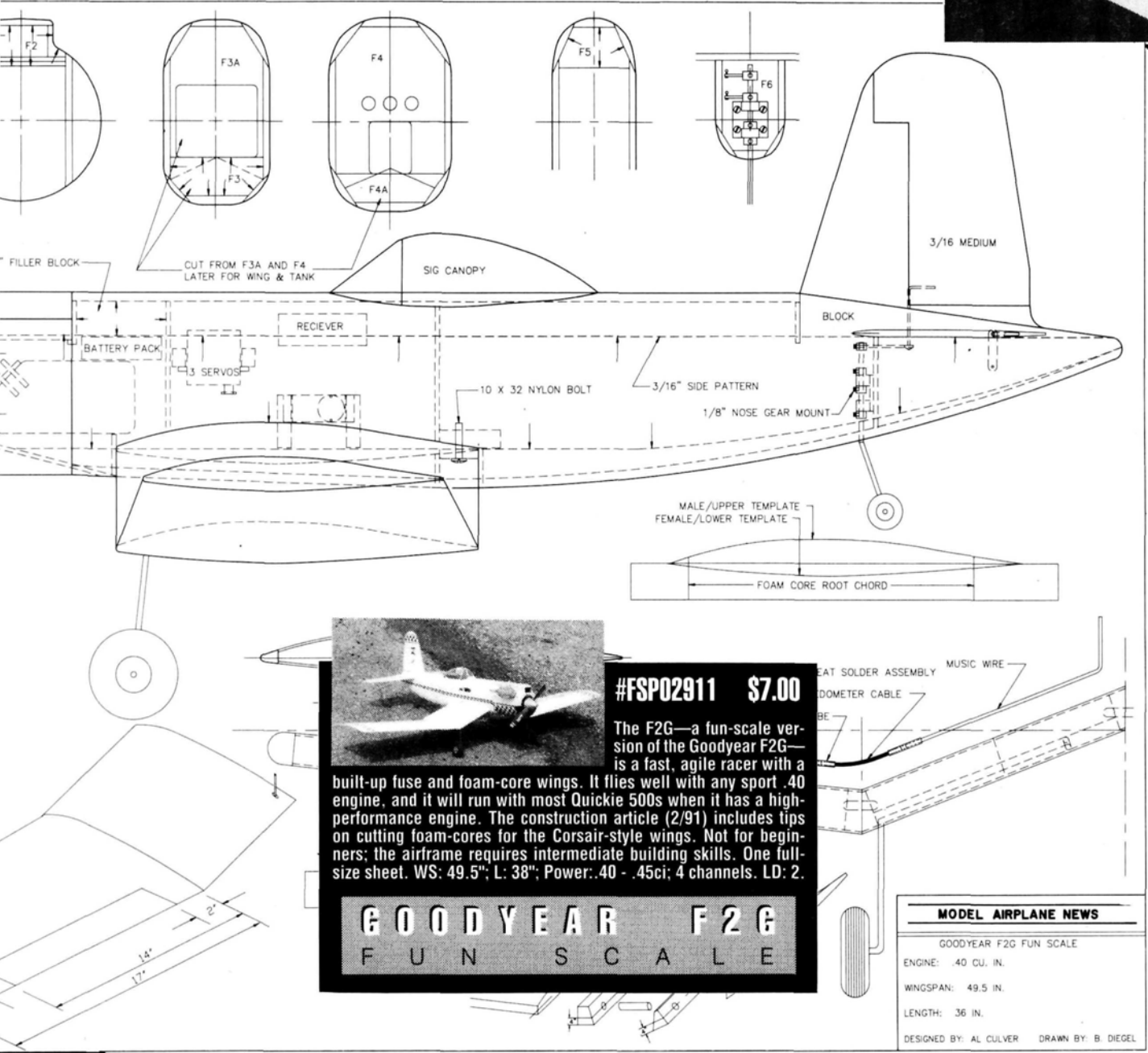
Below: a neat, clean wing.



airplane designs to compensate for gull wings, cranked trailing edges, or just difficult control runs. I've never had a surface flutter with this system, and I use it in high-speed airplanes, e.g., quarter-midgets and even ducted fans.

The speedometer cable is available in most auto-parts stores. New stock should be used because it's hard to get used cable clean enough to achieve a good solder job. The cable should be close to 1/8 inch in diameter, and it will slide into a 5/32-inch brass tube. One-eighth-inch brass tube, 1/8-inch aluminum tube and 3/32-inch music wire will do the rest. Clean everything as well as you can, and use a good grade of acid-core solder.

Cut the parts to length and, starting at the outboard end, assemble the first joint. Apply heat, and feed the solder from the wire end until it comes out on the cable end, but don't let it seep too far down the cable. Move to the other end, and repeat the procedure. Don't forget the aluminum tube bearings, and try to prevent the acid from getting between the steel wire and these tubes. Wash the assembly well in hot water to re-



#FSP02911 $7.00

The F2G—a fun-scale version of the Goodyear F2G—is a fast, agile racer with a built-up fuse and foam-core wings. It flies well with any sport .40 engine, and it will run with most Quickie 500s when it has a high-performance engine. The construction article (2/91) includes tips on cutting foam-cores for the Corsair-style wings. Not for beginners; the airframe requires intermediate building skills. One full-size sheet. WS: 49.5"; L: 38"; Power: .40 - .45ci; 4 channels. LD: 2.

GOODYEAR F2G FUN SCALE

MODEL AIRPLANE NEWS

GOODYEAR F2G FUN SCALE

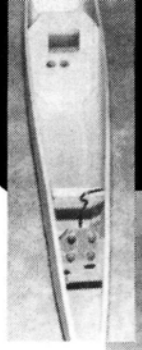
ENGINE: .40 CU. IN.

WINGSPAN: 49.5 IN.

LENGTH: 36 IN.

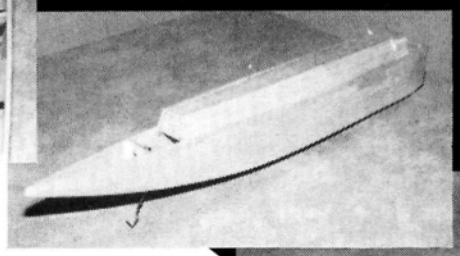
DESIGNED BY: AL CULVER DRAWN BY: B. DIEGEL

ORDER THE FULL-SIZE PLAN...page 128

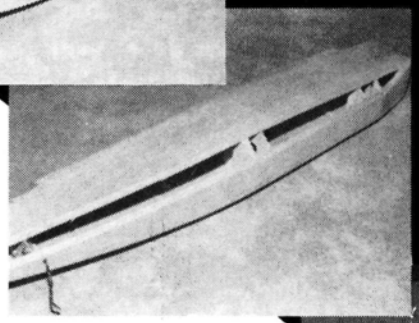


Left: the tail-wheel bulkhead assembly.

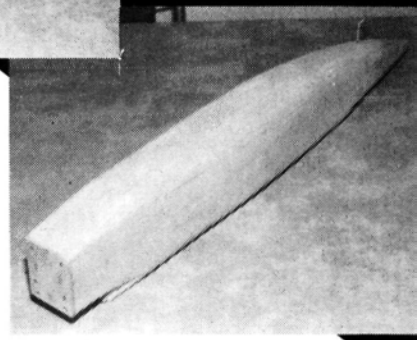
Below: the top deck "roughed in."



Below: the partially completed bottom.



Below: the bottom after sanding. Beneath: this is what dreamers sit back to contemplate!



move any flux, and use a light oil on the bearings.

Rout-out the hinge spar enough to take the torque assemblies, and install the trailing edges and ailerons. Wing tips and sanding are the only jobs left to do. The aileron's length and position on the trailing edge help ensure against flutter. In all faster airplanes, tight hinge lines and an adequate number of hinges are important.

CONSTRUCTION MATERIALS

Music wire: 3/32, 1/8, 5/32 inch
Brass tubing: 1/8, 5/32
Aluminum tubing: 1/8-inch-diameter
1/8 nose-gear mount
1-inch tail wheel
2 1/4 - 2 1/5-inch main wheels
Three 1/8-inch nose-gear steering arms
Sig canopy
8-ounce fuel tank
2-inch spinner
Sig elevator horn
Foremost 40 mount
1/8-inch speedometer cable

Wing materials

11—1/16x3x36-inch balsa pieces
4—3/8x1/2x36-inch balsa pieces
2—1 1/4x5/32x36-inch balsa trailing-edge pieces
2—1/2x3/4x8-inch landing-gear mounting blocks
1—1x1/2x36-inch balsa piece
1—5/16x36-inch dowel length
2—8 1/4x8 1/2x2-inch foam-core blocks
2—8 1/2x16 3/4x2-inch foam-core blocks

Fuselage Materials

2—3/16x3x36-inch balsa pieces
2—1/4x3x36-inch balsa pieces
1—1/8x12x24-inch plywood piece
1—1/2x1 1/2x12-inch balsa piece
3—1/16x3x36-inch balsa pieces

Tail materials

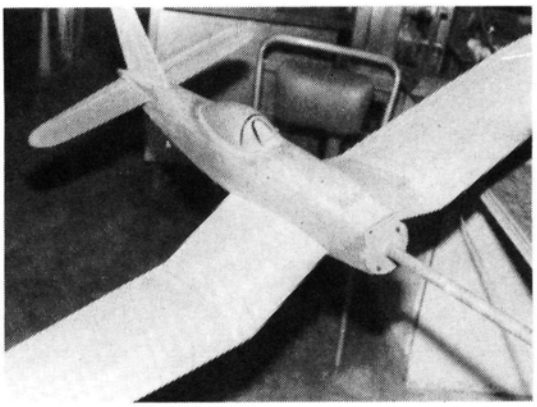
2—3/16x4x36-inch balsa pieces

Templates

6—1/16x2x14 pieces of aluminum or Formica

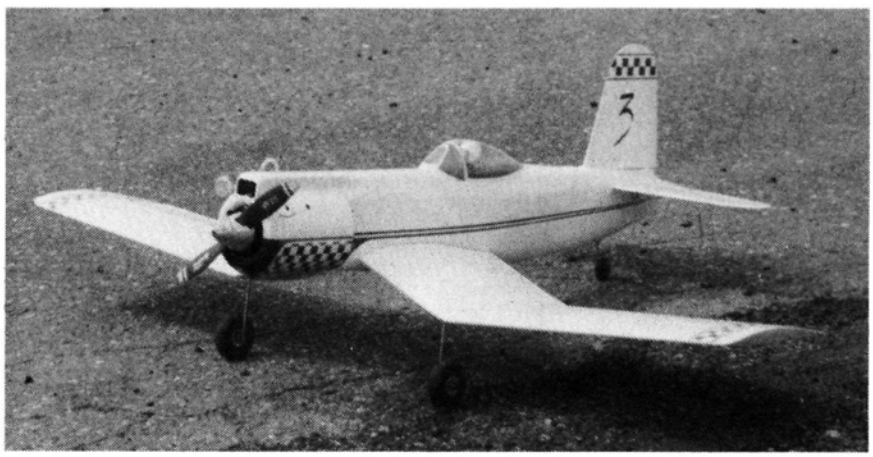
CONTROL THROWS

Carefully assemble the components you've made, and be sure to align everything properly. To avoid the "hanger rash" that seems inevitable when radio installation is left until last, install the radio as you build.

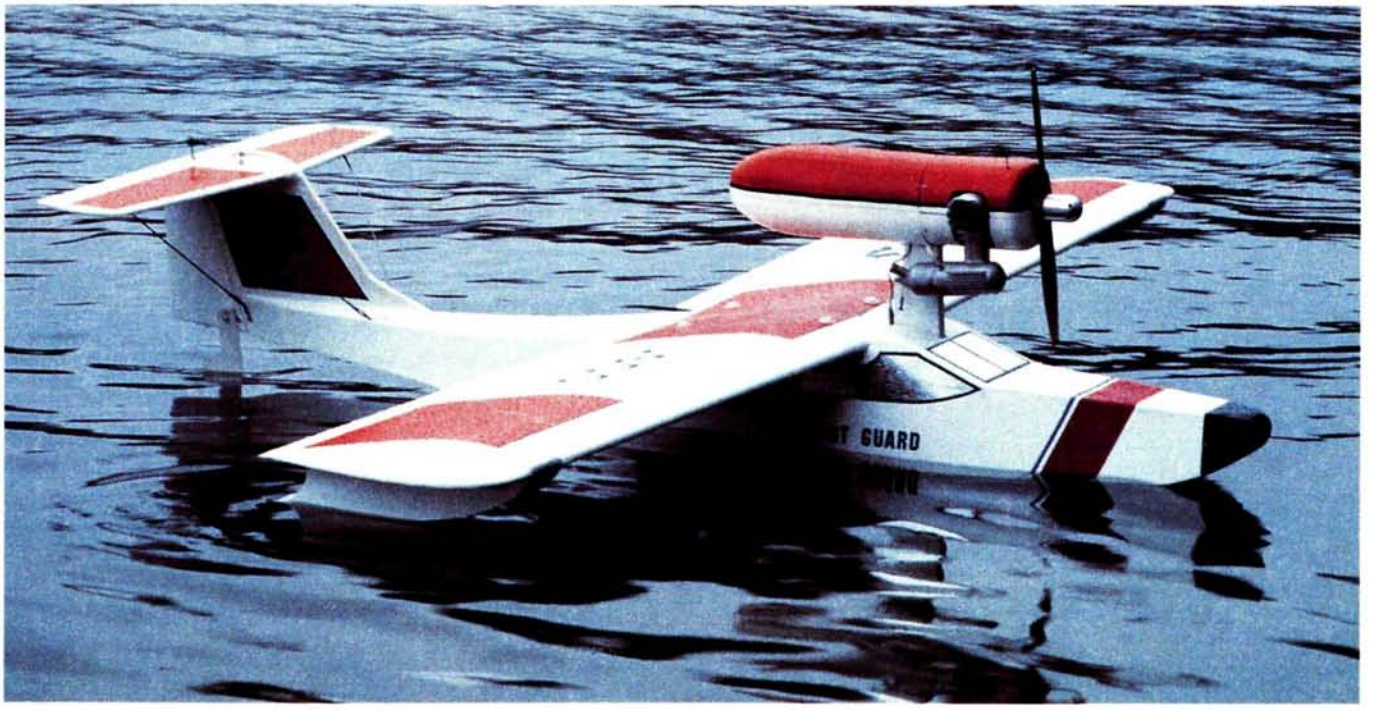


I glass and paint my airplanes, and the finished weight of this one comes out right at 5 pounds. I'm sure the airplane could be built lighter, but it wasn't a priority. With the Rossi, the airplane may be slightly nose-heavy, but with the smaller .40s, it's great. Control movement should be set at 1/4 inch each way on the ailerons, 3/8 inch on the elevator and 1/2 inch on the rudder.

Flying it is much like flying a Quickie 500, and the gear is wide enough to ensure good ground handling. The rudder is very effective, and little to none is needed on takeoff. The F2G comes off the ground fast, so be careful with the up-elevator on the first takeoff. Once airborne, you'll be hard to beat! ■



On the field, ready to fly.



• A • C • E • Seamaster 120

by DICK PURDY

Here's Ace's newest and biggest seaplane kit

PHOTOS BY DICK PURDY

FOR THE OCTOBER 1988 issue of MAN, I wrote a "Field & Bench Review" of the Ace* Seamaster 40 floatplane kit. It was an upbeat review, because building and flying the plane was a happy experience. At the time, I asked *MAN* to let me build, fly and review the larger version of the Seamaster if it became available. Well, it's happened! A new, very large bird has appeared in the heavens above and on the waters below!

PARCEL AND PARTS

The kit's size and weight were intimidating, but the usual Ace quality was immediately apparent. The kit included all the necessary wooden parts: die-cut, lite-ply wing ribs, fuselage sides, top and bottom panels, formers and plenty of spruce and balsa sticks. There was also some heavier plywood (for the engine firewall and the pylon that supports the engine pod), formed plastic halves for the engine pod and a plastic nose piece. Ace kits always supply you with an abundance of hardware parts (I counted 230 pieces on the hardware list alone!), and they're always top-quality, too!

On the smaller Seamaster 40, the leading edge of the wing was supplied in the form of a cardboard-like tube that gave a very

straight, even wing contour. The Seamaster 120 has a similar leading edge, but it's 1/2-inch PVC pipe.

Like most kits, this one didn't include the fuel tank and tubing, the engine, the prop, the radio, covering, adhesives, or wheels. (Ace landing gear, pre-formed wire parts and paint are available.)

To make sure nothing was missing (and to label the plywood parts and familiarize myself with other elements of the kit), I checked the parts against the list in the Seamaster's 28-page manual. All the parts were there, so I began construction.

CONSTRUCTION

• **The wing.** I began by building the wing, and I followed the instructions and pictures closely. Although I had to take my time, I didn't have any difficulties assembling the wing halves. A separate servo is installed in each side of the wing for aileron control, so you can use "flaperons" (if your radio has that capability) to slow down your landings. (Don't get the idea that flying with flaperons is a necessity, however—it isn't.)

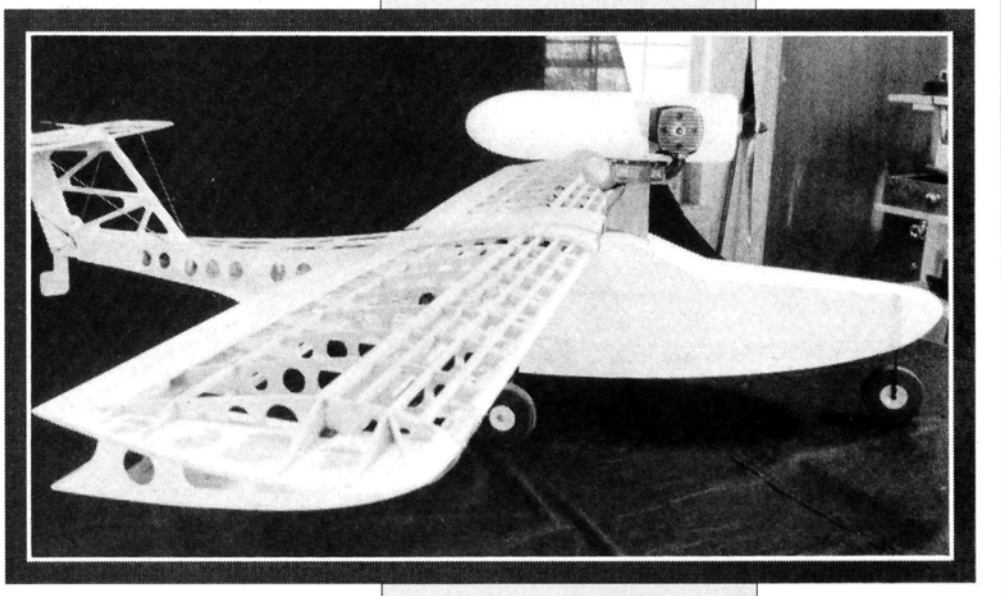
• **The fuselage.** When you punch out the big slabs of lite-ply that form the inner and outer sections of the fuselage, it might seem as if the twist and curl of the plywood will make the airplane lopsided. Ace has, however, designed these parts to interlock with enough tabs and mating slots so that, if you're careful, you'll be able to straighten any unwanted curves. Because the Seamaster's fuselage is really a boat hull that will hit the water at high speeds, use plenty of glue and do a good job. I used a lot of CA and some epoxy adhesive on a few critical joints in the engine area.

• **Rudder mods.** Just as I started to build my kit, I happened to read a Seamaster 120 review in another hobby publication. It said that Ace had received complaints from some fliers and that the company would issue modifications to the plans and a revised rudder/fin configuration.

I called Steve Kaluf (head of production at Ace), and he sent me the new rudder parts. The changes were easy to make, and I built the tail feathers according to the up-

SPECIFICATIONS

Type: *Floatplane*
Wingspan: *85 1/2 inches*
Wing Area: *1,432 square inches*
Wing Loading: *27.352 ounces/square foot*
Length: *75 inches*
Weight: *17 pounds*
Power Req'd: *1.08 to ST3000 2-stroke; 120 to 160 4-stroke.*
Sug. Retail Price: *$199.95*
Features: *the plane has easy-to-align lock-tab construction and a wire-braced, removable tail. Its two-piece, built-up, wooden wing has a semi-symmetrical airfoil, and the pieces are joined by an aluminum joiner. It incorporates a 1/2-inch-diameter PVC-pipe leading edge.*



The Seamaster 120's wing construction, which includes the turbulator spars in wing's forward section. Notice the rib lightening holes.

Comments: *a very large project, the Seamaster 120 has a gentle, easy-to-control glide, but it isn't a "floater." The O.S. MAX 1.08 engine provides more than enough power for sport flying.*

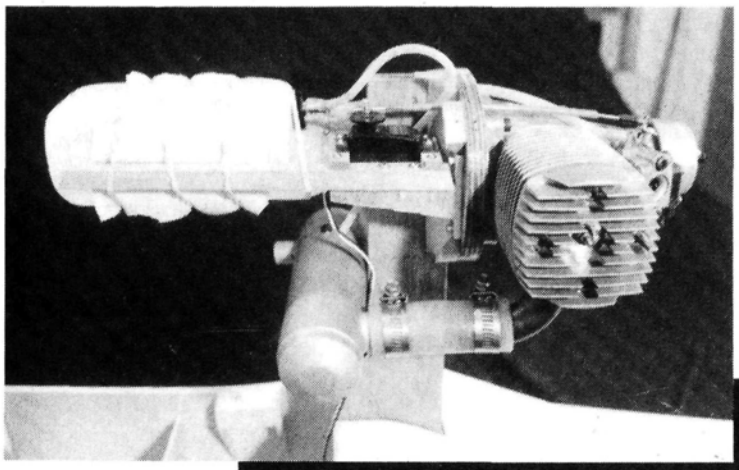
...the takeoffs and landings were almost "hands off" because the Seamaster is so stable

dated plans. (Steve says the rudder mods are included in the new kits, and the updates are available to anyone who bought the original version.)

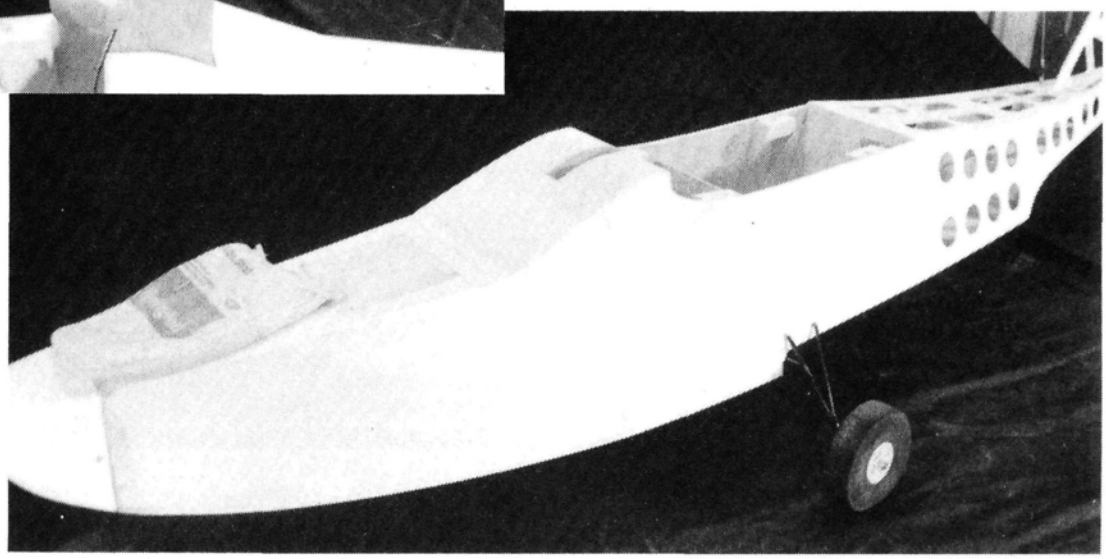
• **Engine support.** The kit's engine pylon is cut from a standard sheet of 3/4-inch fir plywood, with A-grade ply on both sides. I think that a solid, wooden pylon would be better, because the the 1/2-inch plywood firewall is attached to the pylon using two wood screws that are put into the pylon's edge grain. This critical joint is where all the engine thrust is transferred to the plane, and it only has the two screws and the supplementary braces that are glued into place to rely on. So far, the plane flies well with this plywood pylon, but I'm concerned about what will happen after the plywood assembly repeatedly gets wet and then dries out.

I bought a second engine mount, pylon and pod for the Seamaster 120, because I intend to use engines from the low and high ends of the recommended power range, so that I can make comparisons.

• **Covering.** I used Permagloss—a prepainted fiberglass fabric from Coverite*. Although it isn't exactly light, it's strong. It also provides a realistic finish to which you can apply painted panels to achieve the desired color scheme. I used K&B* epoxy spray paint to make the orange rectangles on the wings and tail.



Here are the motor-mount pylon (with the fuel tank), the throttle servo and linkage and the O.S. MAX 1.08 2-stroke engine and muffler.



In this photo, the fuselage is almost finished, and you can just see the alignment tabs that keep everything straight and true.

FLIGHT OF THE SEAMASTER

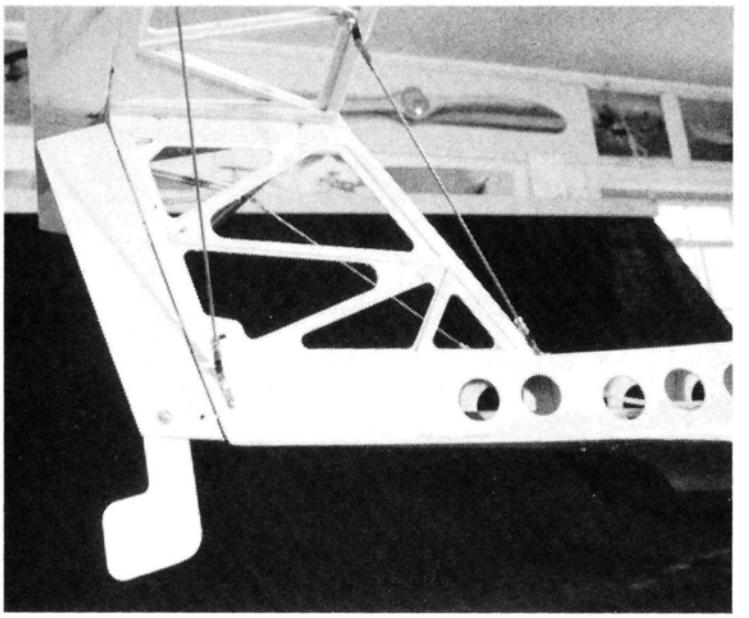
Now comes the moment of truth—flying the Seamaster. Recently, I had eye surgery and, because my vision isn't as acute as it should be, I was afraid to fly this giant new plane myself. I asked my reliable flying buddy, Jim Onorato, to do the honors. (Jim owns a snazzy speedboat from which we've flown model floatplanes many times.) He agreed to be my test pilot, and two of his sons also came along as our photographers.

The wind was very gentle for the plane's flying debut. The sky was cloudy, but the water's surface was just right, and there weren't many other boaters, water

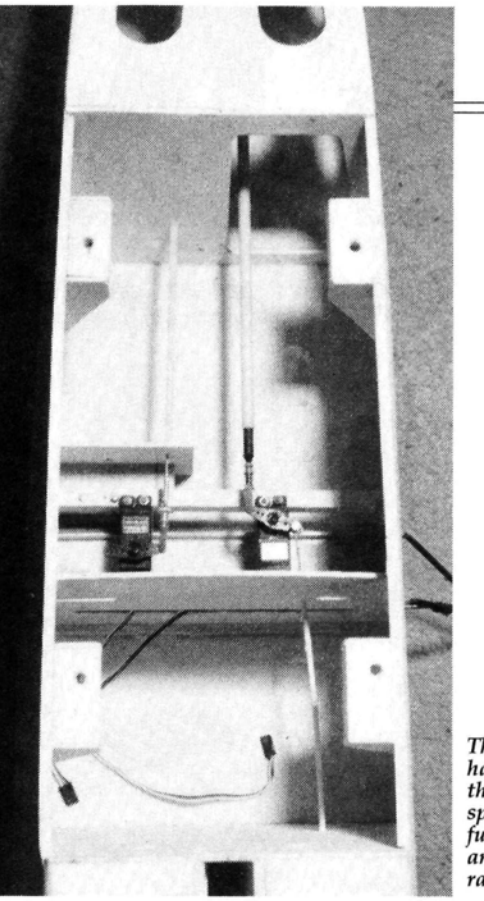
skiers, etc., on the lake. For the first flights, we used an O.S.* MAX 1.08 2-stroke powerplant. After a few throttle adjustments, all systems were "go." Then it started to rain! Although Jim piloted the plane flawlessly (and his sons did well with their cameras), we only accomplished four circuits of takeoffs and landings and some moderate turns.

Jim didn't have to adjust the trim, and he said the takeoffs and landings were almost "hands off" because the Seamaster is so stable. Although it's certainly not a "floater" in the final approach, its glide is surprisingly gentle and easy to control. One minor concern: Jim reports that the tail sinks slightly during left turns. I plan to work on this problem (perhaps the larger engine, still to be tested, will help) and to make some slight corrections that might improve the situation.

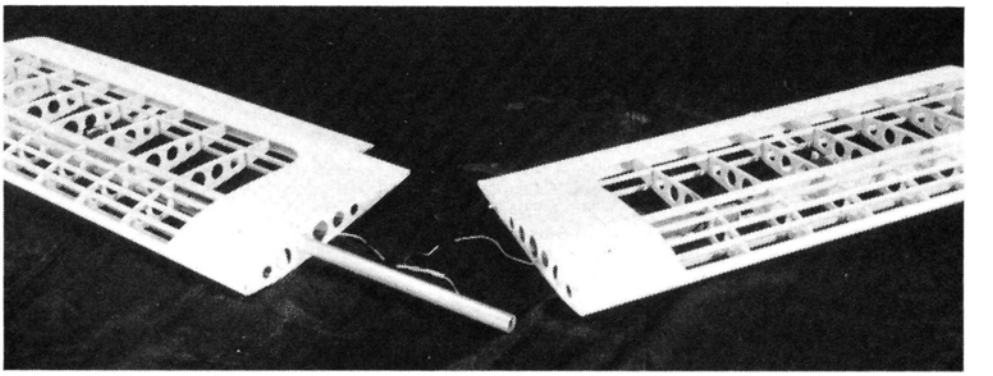
I had fun building the Seamaster 120. It's a handful to transport and launch, but it's a great joy to see it fly. I suggest you try the Seamaster 40 before you tackle this larger version. The 1.08 engine provided more than enough power for general sport flying and, with a larger engine, I expect we'll soon be doing aerobatics.



Attached to the plane's rudder is a water rudder that pivots if it hits something.



This plane has more than enough space in its fuselage for any type of radio.



For strength, the wing halves are joined with this aluminum tube. Notice the alignment dowel near the trailing edge. The leading edge is made of 1/2-inch PVC pipe.

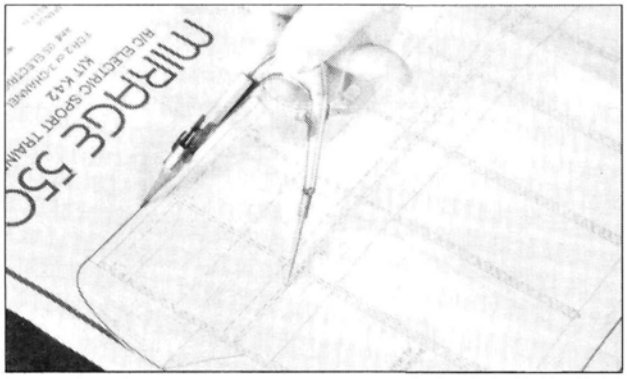
**Here are the addresses of the companies mentioned in this article:*
***Ace R/C, Inc.** 116 W. 19th St., Higginsville, MO 64037.*
***Coverite,** 420 Babylon Rd., Horsham, PA 19044.*
***K&B Mfg.,** 12152 Woodruff Ave., Downey, CA 90241.*
***O.S.;** distributed by Great Planes Model Dist., P.O. Box 4021 Champaign, IL 61820.* ■

HOW TO:

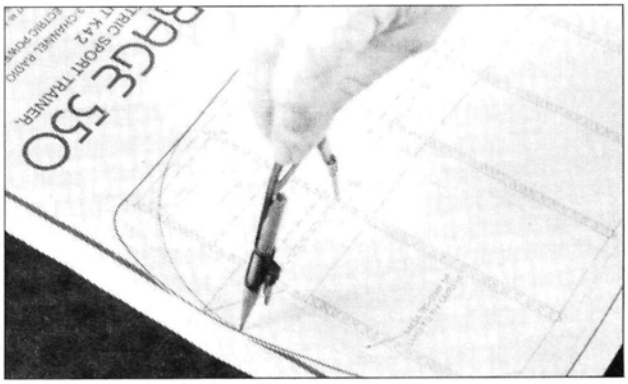
by RANDY RANDOLPH

ADD ROUND WIING TIPS

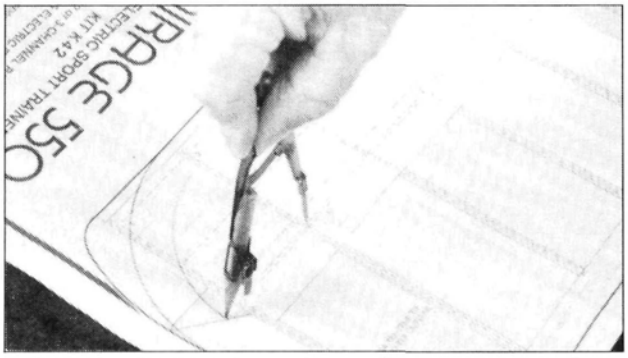
The change from square to rounded wing tips gives an airplane a very different look and is easy to incorporate into most kit designs. The two-circle system shown in the photos produces a pleasing outline that's easy to duplicate on almost any constant-chord wing.



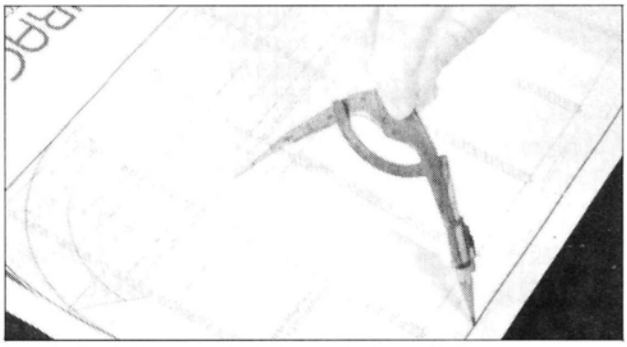
1. *Set the point of the compass on the line that marks the rear edge of the main spar and put the pencil point at the front of the leading edge.*



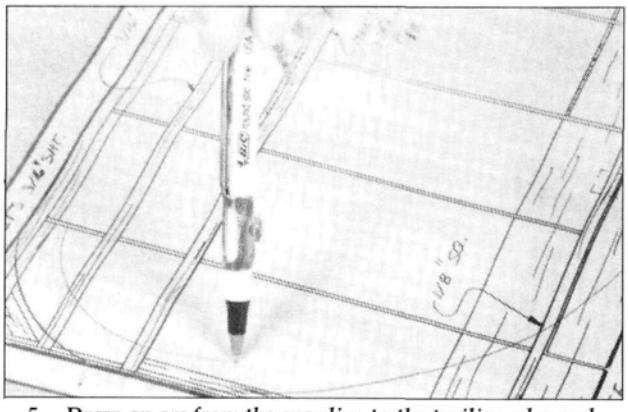
2. *Move the point along the spar line until the pencil touches the edge of the wing tip where this line meets it. Draw an arc from the leading edge to the wing tip.*



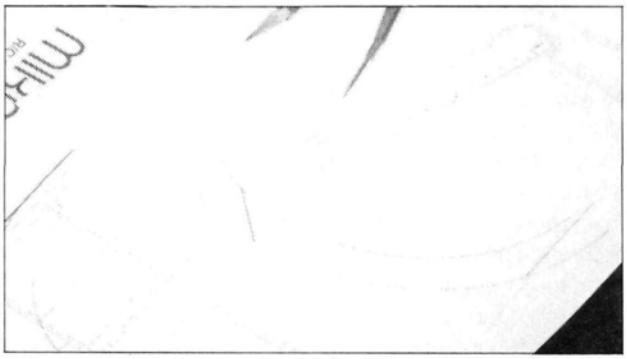
3. *Using the same pivot point, set the compass to a radius that allows for the width of the proposed tip—in this case, 1/2 inch. Draw an arc from the nearest rib (the leading-edge side), to the spar line at the wing tip.*



4. *Using the same technique as before, set the compass radius at the distance between the spar line and the trailing edge.*



5. *Draw an arc from the spar line to the trailing edge and, as before, reduce the radius by the desired amount and draw the inside curve.*



6. *Using the radiuses established on the plan, draw the wing-tip outline on a piece of stiff paper. This will be your pattern. Make the wing tip out of two pieces of balsa that are the same thickness as the leading edge (with the grain in each piece running lengthwise). When you're building a wing, substitute this round tip for the old one.*

Using Plastic Covering Films

by RANDY RANDOLPH

THE TWO MOST important products in the hobby/sport of building and flying R/C airplanes are instant cements and plastic covering films. Of the two, films have probably done more to increase our enjoyment of building; they shorten covering time and improve the appearance of our aircraft.

1 *Plastic film is the best covering material for R/C airplanes! It's easy to apply, inexpensive, durable and available in just about every color!*

2 *The only tools necessary for a first-rate covering job are a household iron (or a special sealing iron) and a razor blade—things found in just about every house!*

COVERING CREDIBILITY

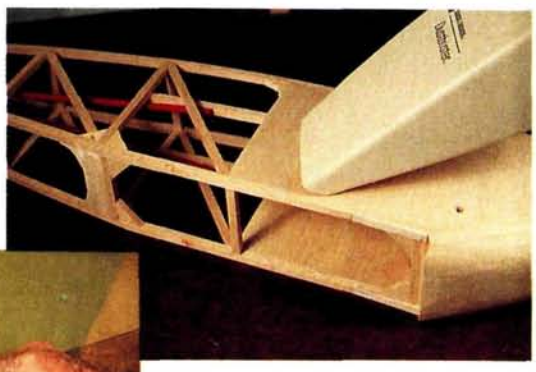
In the "good old days," to produce a really good finish, you had to apply a covering material and several coats of dope. It was a smelly, time-consuming project that could take weeks. The iron-on plastic films are easy to use, quick and forgiving. These are very important qualities, because today's modelers have only limited building time.

Another advantage of film is that you don't need special tools to apply it. To do a first-class covering job, all you need is an iron (a small travel iron works well), a razor blade, a straightedge and a pair of scissors.

All films shrink when heat is applied to them with an iron or a heat gun. Most have an adhesive on one side so that you can iron them into place on a structure. The exception to this is Micafilm*; you have to apply an adhesive called Balsarite* to the structure before you iron it into place. Because there's no adhesive on this film where it isn't in contact with the balsa, it's a very light covering.

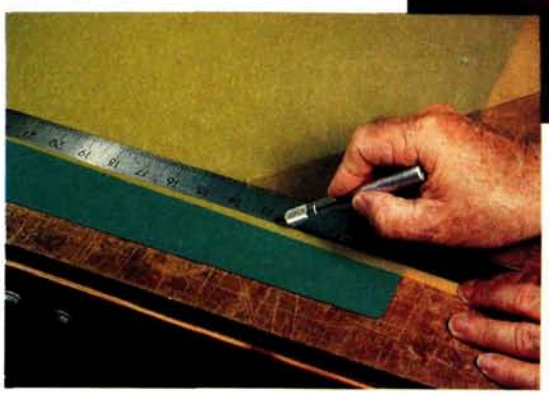
FILM COVERAGE

The first step in any covering job is to determine the areas of the airplane that have compound curves. A compound curve is like the shape of an apple, which curves in several directions. Wing tips, fuselage turtle decks, engine cowlings



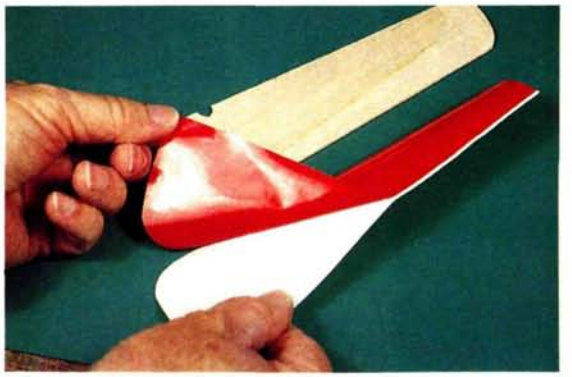
3 *For a good covering job, you need a clean, smooth surface. Sandpaper makes it smooth; a vacuum cleaner or a tack rag makes it clean!*

4 *A "self-healing" cutting board (available at most fabric stores) is a very good surface on which to cut the film. Layers of newspaper work almost as well, but aren't nearly as fancy.*



To allow hot air to vent into the servo well when you shrink the film, drill holes in the ribs before you assemble the wing. This eliminates "ballooning." **5**

PHOTOS BY RANDY RANDOLPH



6 *Presto is a sticky-back film that can be used for covering or for trim. Just peel off the backing, and it's ready!*

7 *To cover a small part, just rub the Presto on with a soft paper towel or cloth. If the area will be subjected to fuel and oil concentrations, you can seal the film's edges with a warm iron .*

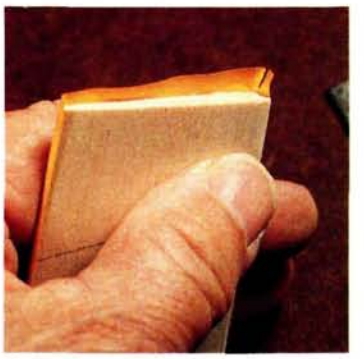
and fillets usually have compound curves. Cover them using small strips of film, or stretch and heat the film as you apply it. Wing panels, stabs, elevators, rudders and fuselage sides are simple curves that you can easily cover with large sheets of film.

There are true, film-application masters, and their work is extremely difficult to distinguish from a spray-painted and hand-rubbed finish. Most of us settle for something less, and we still have very good-looking airplanes. For a good finish, sand the structure before you cover it to remove any lumps or bumps, then wipe off or vacuum the sanding dust.

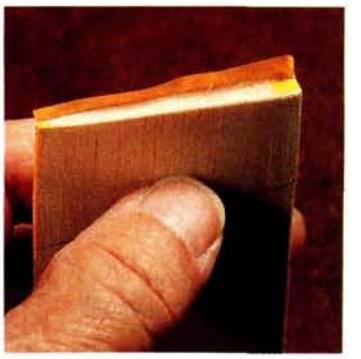
If the film has printing or clear strips on its edges, you'll have to remove them. Actually, you can wipe the printing away with a paper towel dampened with acetone, but the clear strips don't have adhesive, so trim them off using a straightedge and a razor. If you put the film over sheets of folded newspaper, cutting and trimming is much easier.

When you cut the film to match the area you want to cover, allow at least a 1-inch overlap all around. When you cut the film, make sure that the glue side will be in the right place on the finished piece. This is especially important when you're working with tapered or odd-shaped parts. If you cut the film to fit with the glue side facing the wrong way, it won't stick to the airplane, just to the iron!

The protective backing on the glue side of some films slips away very easily, but with others, you have to lift it and peel it off. It's possible to iron the latter type of film to the framework with the protective covering still in place. It's not easy, but it can happen. The film will stay in place for a while before it peels away (usually in the air, with disastrous results!). Before you attach each piece of film, make sure that you've removed its backing.

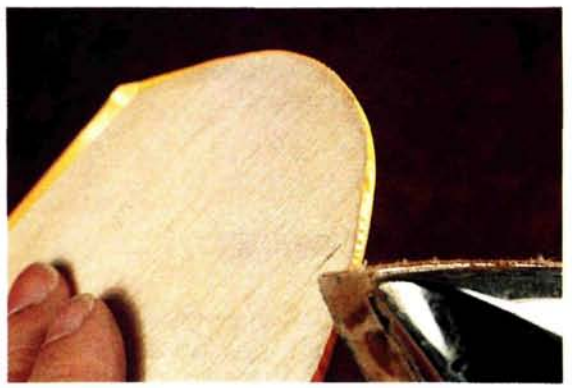


8 *When covering square ends (like this elevator), it's best to overlap the film. Cut along the seams at the leading and trailing edges with a razor blade, and...*

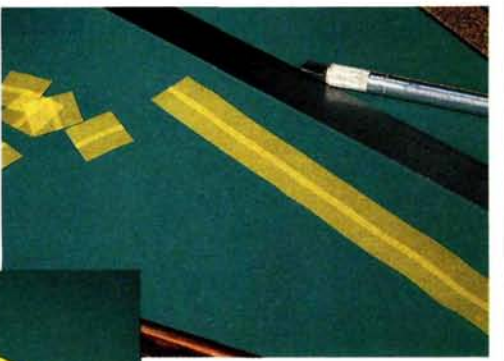


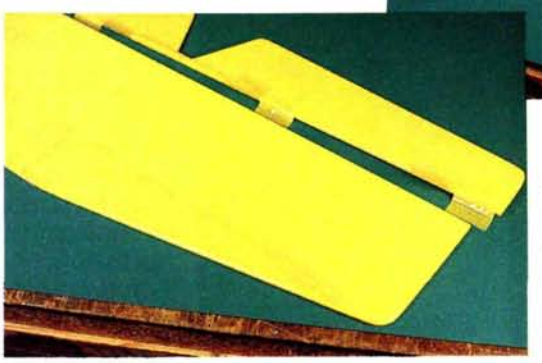
9 *...iron the small tabs you've cut onto the end of the surface. Fold the remaining part over, and seal it with the iron. Then cover the bottom and treat the other end in the same way for an oil-free finish.*

10 *To cover round edges, trim the film to a 1/16-inch overlap and iron it over the edges. Rock the iron over them so that the film shrinks as it adheres, and the edges will stay wrinkle-free.*



You can make hinges out of film by ironing two strips together with their glue sides overlapping by about 1/8 inch. Then, slice half-hinges to **11** *the desired width. The half-hinges will have the glue side up on one end and down on the other.*





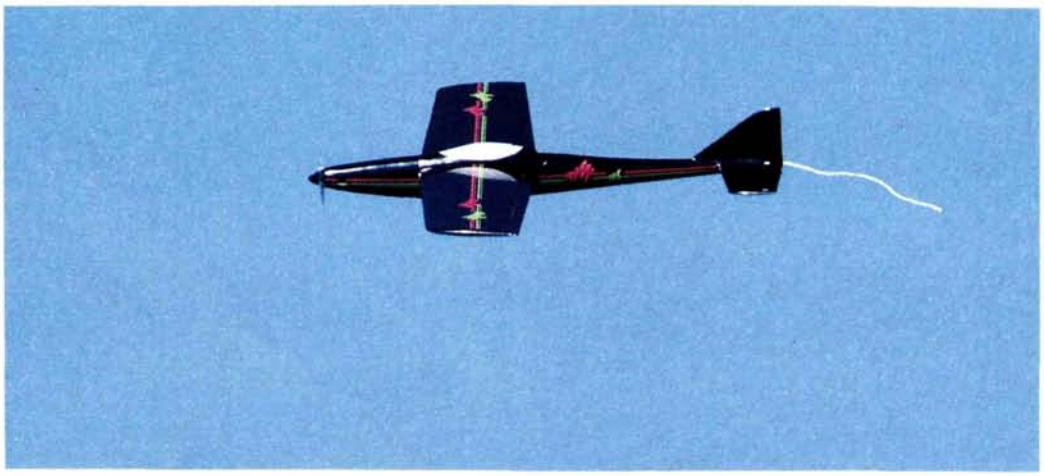
12 *To make a hinge, iron one "half-hinge" onto the top of one surface and the bottom of the mating surface. Then, iron another half-hinge next to the first, but to the opposite side of the mating surface. Space the hinges about 3 to 4 inches apart.*

BALLOONS AND BUBBLES

Air that's trapped between the film and the structure can be a problem. It can be trapped when you shrink the film on one side of a built-up wing panel, a stab or a rudder after you've covered the other side. To avoid the problem of trapped, hot air ballooning out

(Continued on page 86)

This fast, aerobatic electric is another in the new breed from Europe



SIMPROP HIGH SPEED

HANG ONTO YOUR hats, fliers! The new breed of high-performance electric model airplanes is here! This Simprop* High Speed is typical of German designs in that it features excellent engineering and high-quality materials. (For now, the Europeans seem to have the edge in getting this level of technology and performance into the air and onto the market.)

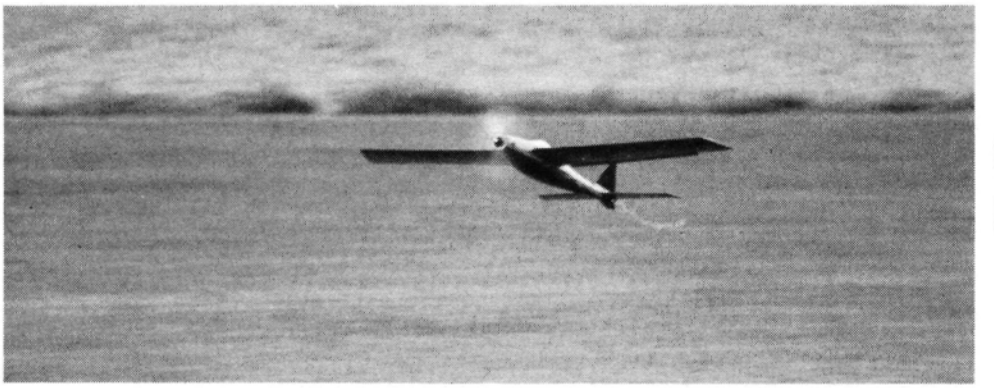
The Hobby Lobby International Simprop High Speed uses just aileron, elevator and motor control. It's fast, aerobatic and larger than an 05-class pylon racer, so its maneuvers are graceful and not at all twitchy. A high-performance motor is a must, and Hobby Lobby recommends the Graupner* Ultra 900 motor with a Graupner 9x5 folding prop running on 12 cells. The high current draw of this power system limits flights to a few minutes, but this is a tradeoff you make for the Simprop's breathtaking performance. Cost is also considerable (just over $400 for the airplane and the recommended power system), but if you're a dedicated electric modeler or a gas-powered flier who wants to equal glow performance, then the Simprop High Speed is a great choice.

I started the project only three weeks before the big KRC Electric Fly in Pennsylvania; in fact, I test-flew it only twice on the weekend before the meet. At KRC, I logged five flights on a very windy Saturday and four more on a beautiful Sunday. The judges awarded the High Speed 1st place in the Aerobatic Kit category, and the Timed Speed Run netted a 3rd-place standing. To say that I'm *pleased* with the model would be a real understatement!

"...it features excellent engineering and high-quality materials."

PHOTOS BY RON FARKAS

by RON FARKAS



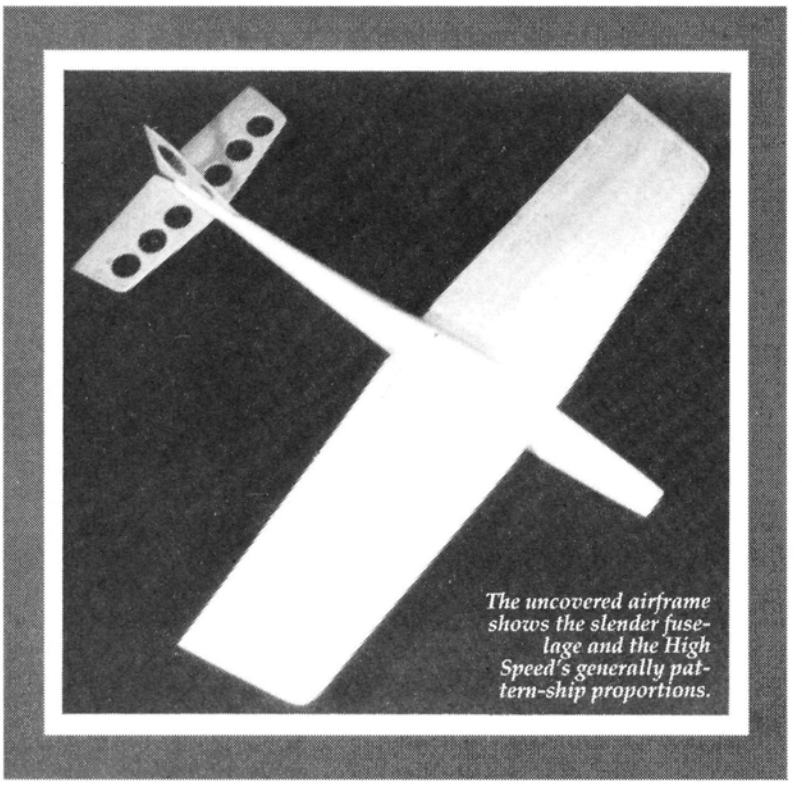
HIGH SPEED

THE KIT

The components are all of the highest quality, and the major parts are just the wing, the fuselage and the tail. The fuselage is molded of epoxy fiberglass covered with a white gelcoat, and its canopy fairing is a separate piece. The left and right wing cores arrive joined and pre-sheeted in one piece from tip to tip. Dihedral is built in, and there's no center seam in the balsa skins. High-stress areas, e.g., the dowel and hold-down bolt locations, are reinforced beneath the balsa skin with hardwood veneer.

Sections are milled out for the servo, the ailerons and the torque rods. The kit includes shaped balsa leading edges, strip stock for the aileron caps, blocks for the wing tips and milled, sheet-balsa tail surfaces. The few internal fuselage parts are of die-cut aircraft-grade plywood sheets. The assortment of hardware included torque rods, hinges, pushrods and clevises.

The plan is drawn in half size, and instructions are clear and coherent (there are 18 photos), but they're brief and obviously intended for experienced builders.



The uncovered airframe shows the slender fuselage and the High Speed's generally pattern-ship proportions.

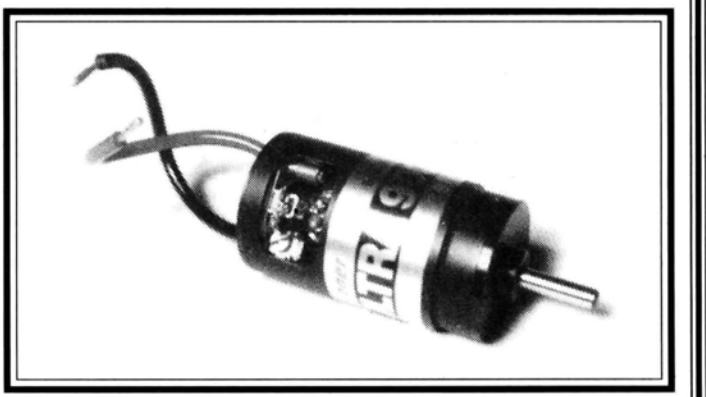
CONSTRUCTION

The high degree of prefabrication leaves you with very little work to do. The airfoil is a thin, symmetrical, laminar-flow section with a sharp leading edge. Milled slots almost fully separated the ailerons, which were easy to remove. The leading-edge stock and wing-tip blocks must be glued into place and, since they were oversize, carved and sanded to their final shape. The servo and pushrods go on the top of the wing and are covered by the canopy.

A die-cut plywood motor-mounting ring must be installed inside the fuselage, right up against the nose. As predicted in the instructions,

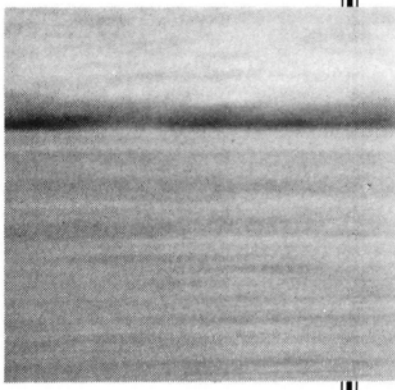
SPECIFICATIONS

Type: *Electric-powered sport/pattern*
Wingspan: *47 inches*
Weight: *4 pounds, 4 ounces (68 ounces)*
Wing area: *418 square inches*
Wing loading: *23.5 ounces per square foot*
Power req'd: *Graupner Ultra 900 (recommended) and 12 cells*
No. of channels: *3 (aileron, elevator, motor)*
Sug. retail price: *$222 for kit; $208 for motor.*
Features: *Epoxy/fiberglass fuselage, pre-sheeted foam wing, sheet tail surfaces, hardware.*
Comments: *The High Speed's top speed is breathtaking, and its aerobatic performance is good. Its high-quality components are easy to assemble.*



Below: The Graupner Ultra 900 motor is approximately 05 size, but it's longer and heavier and produces much more power.

HIGH SPEED

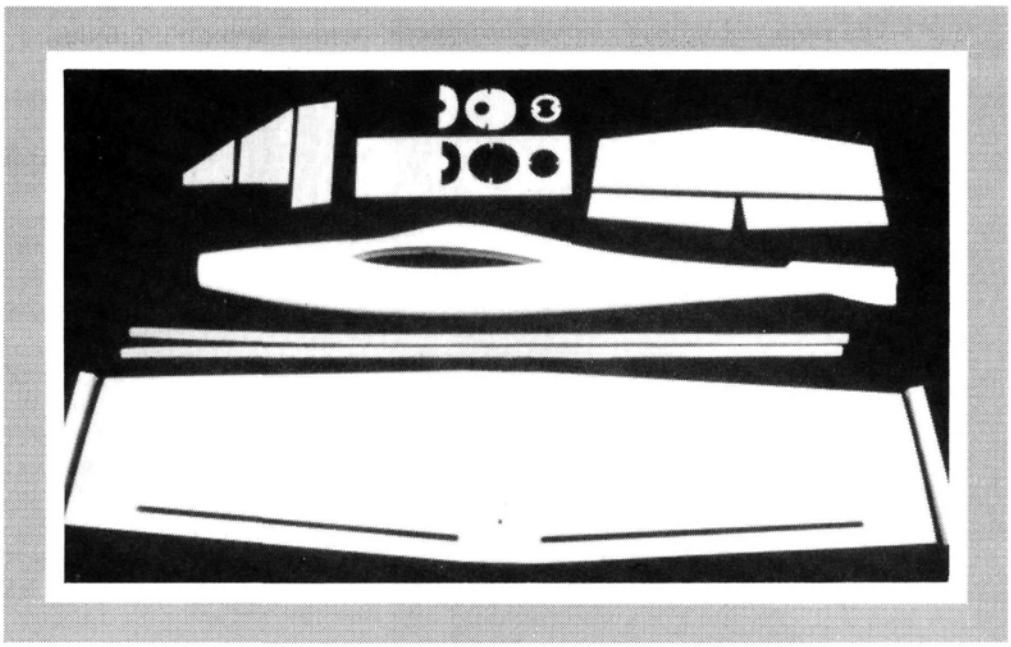


fitting it was a trial-and-error process. I glued it into place with a mixture of Hobbypoxy* Formula II and Bob Violett Models* milled glass fiber. (If you want to install a glow engine in the .29-cubic-inch range, there's an optional firewall and motor-mounting plate.)

The servo tray, the wing hold-down block and the leading-edge dowel reinforcements all fit well inside the fuselage. The hole in the dowel reinforcement wasn't well-aligned, and this made the drill wander. I recommend that the reinforcement be left out until the hole has been drilled in the fuselage to match the actual dowel location.

I substituted a 1/4x20 nylon bolt and blind-nut for the metric ones supplied. I glued two ply plates inside the canopy to accept the wood screws coming up from underneath the wing. This allows the canopy to be removed easily for servo maintenance. Drill a hole in the canopy for a tube that guides a screwdriver into the slot. (For easier gluing and sanding, I replaced the supplied brass tube with a piece of fiberglass arrow shaft.)

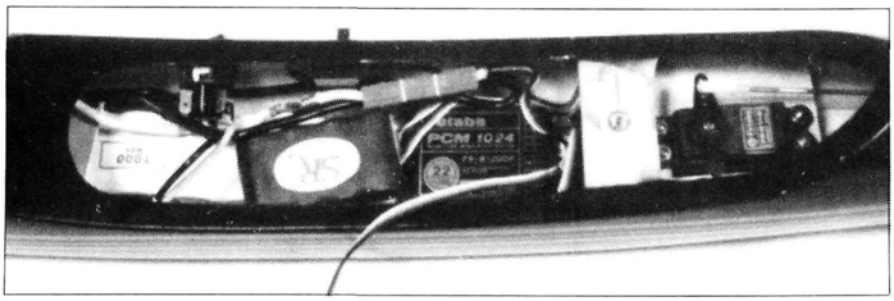
The fin is in three sections with the grain running vertically. The one-piece stabilizer has the grain running spanwise, and the grain on the tips runs chordwise to prevent warping. The lightening holes are optional, but highly recommended. After roughing-out and filing the slots that mark the locations of the stab and fin, I installed the tail surfaces with thick CA. Later, after covering the tail surfaces, I made fillets with epoxy and microballoons.



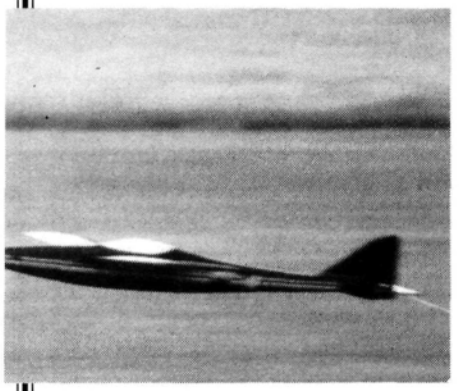
The kit's components are highly prefabricated (wing comes sheeted). The fuselage is epoxy/glass and the tail is sheet balsa.

Although optional external air scoops are shown on the plan, I chose to cut a small inlet in the nose and an outlet on the bottom of the fuselage aft of the equipment compartment, and I faired the inside of each opening with 1/64-inch plywood to direct air past the motor and battery.

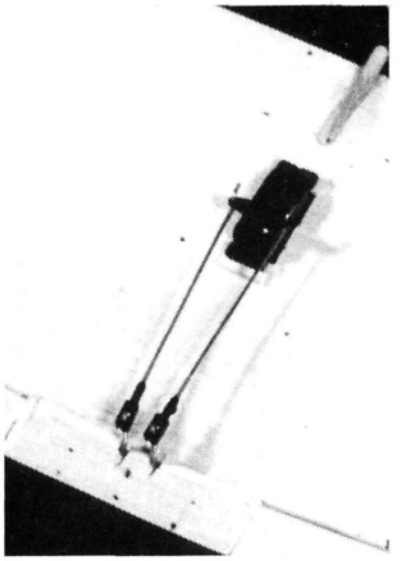
There's plenty of room inside the fuselage for the power system and radio components. I use a Futaba* 7-channel PCM receiver, two S-148 servos and an SR* 300mAh airborne battery pack. Two 6-cell SR 1000mAh Max Pack motor batteries lie in line on the bottom of the fuselage and are



The fuselage has plenty of room for the radio and power system (as long as you use flat packs).



held in position by Velcro®. There's room for a couple more cells and/or packs with a higher capacity. The motor control is located in front of the wing and above the motor battery. I've used both the Graupner Mini-Switch 40 motor on/off relay and the Jomar* SM-4 proportional speed controller, and both fit well. The finished weight of 68 ounces is 3 ounces more than the target, but it still gives a wing loading



The aileron servo and linkage are installed on the top and covered by the fiberglass canopy.

of 23.5 ounces per square foot, and that's reasonable for this type of airplane

I ironed Hobby Lobby's Oracover onto the flying surfaces and sprayed Hobbypoxy paint onto the fuselage. Oracover is good for large sheeted surfaces because its adhesive can be activated by a

Text continues on page 109. For information on battery improvements, see next page.

duke's mixture

The words "It went lean on me," has to be one of the most used, least understood phrases in modeling today. It seems that any time a model motor loses power, the accusation is "it went lean on me." There are several reasons why a motor could slow down and, possibly, quit. A properly broken-in model motor, running on the right fuel and plug, and properly cooled, does not sag and heat up when the fuel level is dropped too far or the needle is tweaked in too far. What should happen is that the motor just slows very slightly and then quits firing. In the cases when the motor sags down and cooks, there are three probable causes: (1) the crankshaft bearings are not getting enough cooling fuel and heat up and start dragging, (2) the cylinder and piston don't have enough clearance and start binding, or (3) (and the most usual cause of all) is that the motor starts pre-igniting. When the motor is leaned in and makes more power, it also makes more heat. When it makes more heat, the plug element gets hotter and the ignition starts occurring sooner. If the motor has a little extra heat added because of being new and creating friction, or because the weather is hot, or because the fuel has too much nitro, or because the glow plug retains too much heat, the motor can come up to a critical point at which the ignition starts too soon, and with the over-advanced ignition, the combustion pressure presses the piston down on part of the up´stroke, and this in turn generates more friction and more heat, which again further aggravates the pre-ignition problem. Most model motors are set up so that they will run very close to the pre-ignition point, because that is the way that we get the most power. Once a motor goes over the power peak, the only way to get it back is to throttle back and cool it off. Remember, if you start to lean your motor in to get maximum power, and as the motor warms up it seems to slow down, you are suffering from pre-ignition. A slight bit of pre-ignition on a dead lean setting may not be too bad because that is the way you usually get the most power out of your motor. However, if there is much sagging at a dead lean setting, then you are giving away too much of the rich lean tolerance of the motor and something should be done. Switching to a cooler running plug helps. Reducing the nitro in your fuel can make a lot of difference. Adding a little more oil to your fuel can help some. And if all of these put together in reasonable quantities isn't enough, then reducing the compression ratio is in order.

Unfortunately, we see a lot of cases of pre-ignition these days. One of the reasons is that nitro is not as expensive as it was a few years back, and people, thinking that more nitro means more power, will order the more expensive fuel. It is not a bad idea to carry around a can of FAI type fuel (4 parts straight alcohol, 1 part straight castor). The next time you or one of your flying buddies experiences a "leaning out" tendency, try cutting your fuel with the FAI mixture and see if it doesn't help.

For those of you who may not have experienced the thrill of flying a Fox motor, and would like to at no risk, we make this offer:

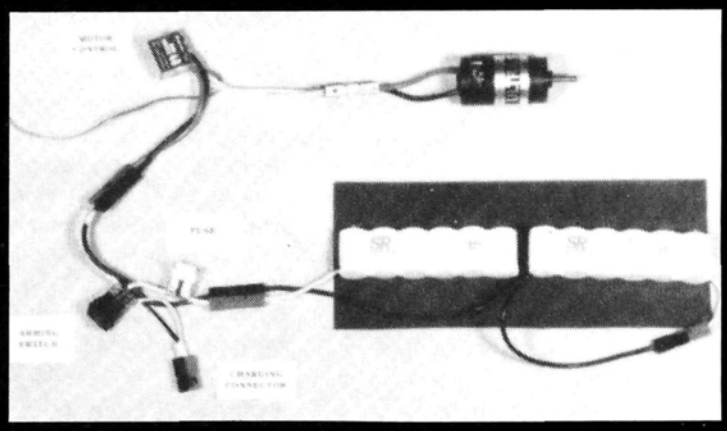
We will loan you either a Fox 40 Standard or an Eagle 60, your choice. Fly it in your own airplane. After 30 days, return the motor to us. You pay only the U.P.S. charges back. We would want your Visa or MasterCard number, which we would charge only if the motor was not returned. Can't beat a deal like that, can you?

Happy flying,

Duke Fox

HIGH SPEED

MAKING BATTERY IMPROVEMENTS

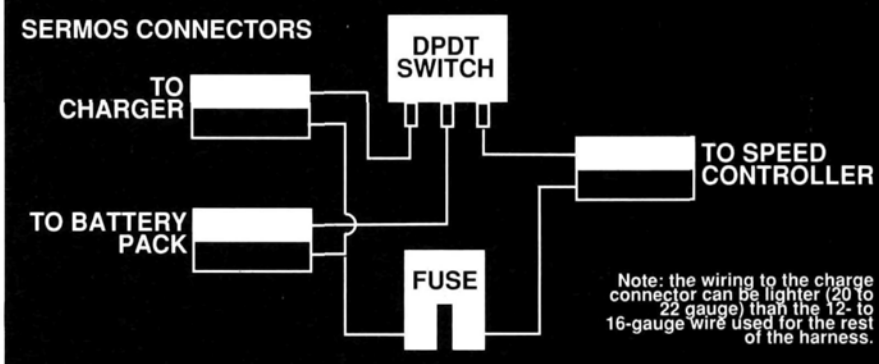


In the Simprop High Speed, the batteries and wiring are almost inaccessible, and they certainly aren't removable for charging, so I needed a way to connect the charger without unplugging the batteries. I solved the problem by installing a separate charging plug in the motor-battery wiring harness.

Because time was short, I ordered a custom-made harness and the battery packs from SR Batteries. The arming switch is a heavy-duty, double-pole, double-throw (DPDT) unit. A fused lead takes power from the battery to the switch's center lug. One side of the switch has leads that go to the motor controller, while the other side goes to the extra charge connector. Charging can therefore be accomplished when the arming switch is in the "off" position. I used 12-gauge wire and Sermos* connectors to handle the motor's high current draw. With a little ingenuity, the charge connector could even be mounted through the fuselage side, but I didn't get around to that. SR also made up two, 6-cell flat packs that have extended leads so that they can be mounted behind each other and connected in series.

CONNECTING A CHARGER

Wiring harness to use with either a proportional speed controller or an on/off speed controller. Note: when a BEC is used, the fuse must be between the speed controller and the motor.



Note: the wiring to the charge connector can be lighter (20 to 22 gauge) than the 12- to 16-gauge wire used for the rest of the harness.

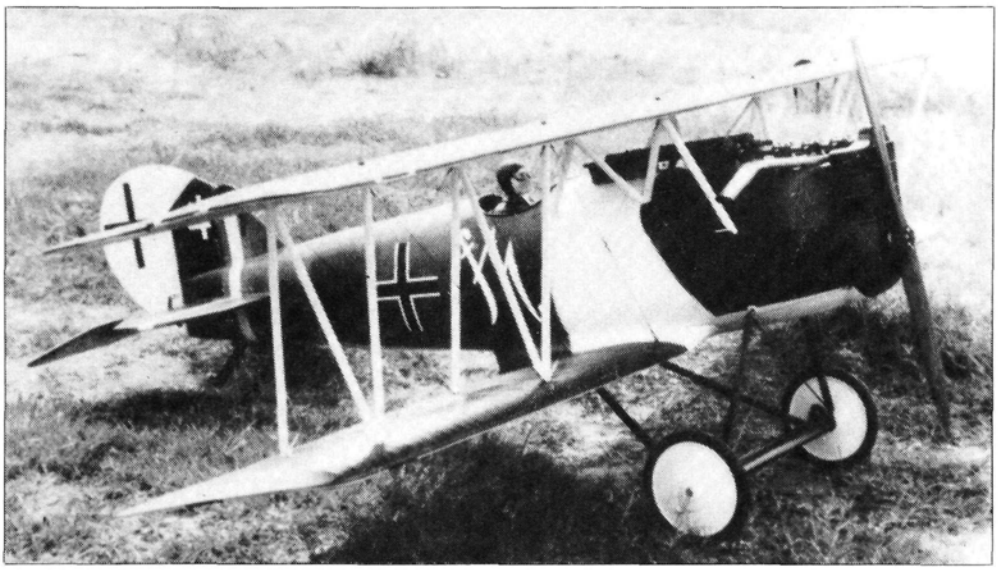
This diagram shows a wire harness with a charging jack. The Simprop Speed custom harness has a fuse between the switch and the battery pack.

GIANT STEPS

Old-time painting secrets for your new planes!

by DICK PHILLIPS

LAST MONTH, I discussed how to use glider-grade Dacron covering on large models. Dacron is an excellent, great-looking covering, and it's easy to apply. It sure beats any of the iron-in coverings, and it's less expensive, too! This month, I'll share some tips on painting it that I've discovered over the years.



The plan for this Pfalz DXII by Dennis Bryant was photographically enlarged from 1/6 to 1/4 scale.

SECRET RECIPE

Dacron is quite porous, and properly covering it with most paints would be difficult without first preparing it. There is, however, an inexpensive, easy, paint-preparation method. (It's a well-known secret among the old-timers who used it on silk-covered free-flight models. Found at your local market, the secret to preparing the Dacron for painting is gelatin ("Knox" is one of the common brands). Apply gelatin to the Dacron before you paint it to fill the gaps in the weave and make it easier to paint.

Prepare the gelatin according to the instructions on the package. A small package makes enough primer (about 1 quart) for a very large model, and it costs only pennies. (To store the gelatin for any time, you'll have to refrigerate it. It will become solid, but you can liquefy it by placing its container in warm water.)

Make sure that you completely cover the model, and it's very important to *apply only one coat*. If one coat is good, three coats will be three times as good, right?—wrong! If you apply more than one coat, they could separate and cause your final finish to flake off, and that could spoil your whole day! When the gelatin is dry (it doesn't take long), the covering is ready for your favorite paint which can be brushed, sprayed, or "swabbed" on.

PICK YOUR PAINT

I've successfully used a variety of paints on gelatin-primed Dacron, including the usual modeling paints, epoxy finishes (two-part) and many of the common hardware-store spray and brush finishes. If you're in doubt about which finish to use, make up small sample Dacron squares on open frames, and test the finish you want to use. One warning: if you intend to use paint that has a flex additive (a compound that allows cured paint to flex without cracking or crazing), add it to the paint that's to go on unsupported fabric surfaces. Where the Dacron is supported, you can omit the flex additive.

STRENGTH AND GOOD LOOKS

Dacron is my favorite covering material, and I use it on most of my models. The method of shrinking the Dacron sleeve over the completed fuselage provides the structure with considerable strength, so even my planked or sheeted models get the treatment!

Years ago, I finished my Balsa USA* Sopwith Pup with Dacron covering and this painting method, and it still looks as good as the day I painted it. (Well, when I clean off the dust and dirt it will!) Further, the Pup's Dacron covering is still tight after a lot of flying.

If you properly finish the covering, it will be as tough as rhinoceros hide. I've never found anything that works as well and is as easy to use. One reader wrote to tell me he tried the method (with some doubts), and he was so pleased with the results that he has been spreading the word. That's a pretty good recommendation!

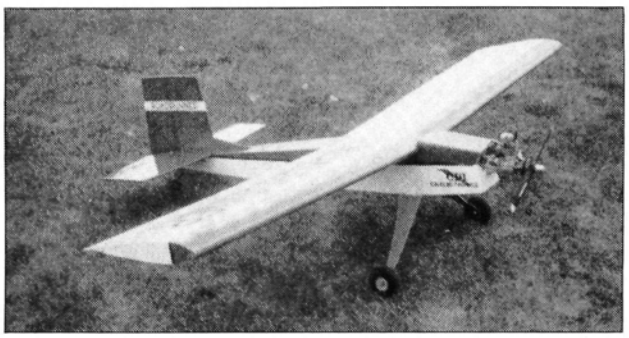
DOCUMENTING YOUR MODEL

Although talking about model documentation after discussing painting and finishing is like putting the cart before the horse,

(Continued on page 72)

GIANT STEPS

(Continued from page 68)



The Roadrunner sport model is available as a plan or as a kit.

that's often what happens in reality. If you have a well-built, good-looking model, you're usually encouraged to enter it in local scale contests and, to do so, you have to find documentation to support it. This is the *wrong* way to do such things! You should obtain the available documentation *first* and then make and finish the model to match it!

Many production airplanes were altered over time, and even some one-off airplanes were radically modified. (Several small pylon racers come to mind; they were visibly modified as they were passed through the hands of a variety of owners.) Military production aircraft were continually being modified, too (the variety of military models attests to that fact!). Such modifications make gathering documentation material *before* construction begins extremely important. The scale contenders do their homework first, and their documentation is firmly fixed before the knife hits the balsa!

Finding the right documentation material could take a long time, or it could be as easy as referring to one of the well-known "Profile" publications. The more common the airplane, the more material will be available on it. (It might take weeks or months to find the right information on some of the more exotic, obscure airplanes.)

HOW MUCH IS TOO MUCH?

Like money and beer, there's no such thing as too much documentation. That doesn't mean that you'll use all of it, because contest rules limit the amount of material you can have in the documentation folder. Having more information than you need, however, is *a lot* better than not having enough! You can prune the material to suit the model you're building and the constraints of the rules. Your contest documentation folder should contain proof that your model duplicates the original, full-size machine, so you should include as much as possible to *support* your model.

Most scale modelers have a list of "someday" airplanes that they intend to build. I have a few planes in my "someday" file and have collected documentation material on them over many years. One of these days, I'll have to build them just to take advantage of all the material I've gathered!

CORRECT COLORS

Documenting colors is a different ball game. Few scale judges can honestly claim that they're able to judge color exactly. If you look at the scale prototype, then compare it with a replica, they won't look the same; the eye sees vastly different sizes of the same thing differently. Because a full-size plane has been flown at high speeds, withstood weather and been washed in a variety of ways, its paint has been changed. On the other hand, models usually aren't primed or washed in the same way as full-size planes, and they probably spend most of their time in the shop. These differences make scale color judging very subjective.

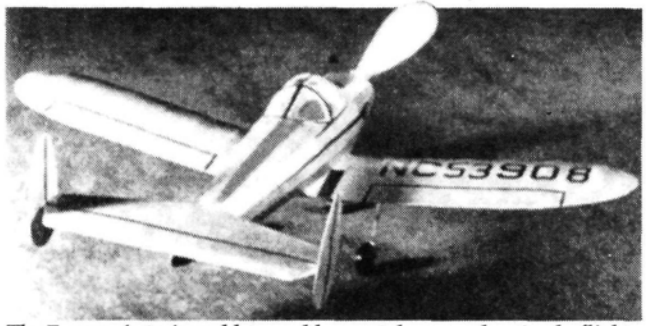
One thing about documentation is certain: gather it before you start

(Continued on page 116)

FIFTY YEARS AGO

ODE TO A FLYING FIELD

by KATHERINE TOLLIVER



The Ercoupe's twin rudders and large stab ensured a steady flight.

"OH, FOR A flying field unencumbered by trees and liability insurance"—*anonymous*.

True; this is probably one of the shortest odes ever written, and perhaps the only one to a flying field, but it is, nonetheless, heartfelt. Even 50 years ago, finding a good flying field was a problem, and it was the subject of an article entitled, "Let's Have More Model Airports" that appeared in in *MAN's* February 1941 issue. As the photos revealed, things seemed a little less complicated back then. Here's the 1941 version of crowd control: one lone State Trooper is shown standing under a billowing windsock in front of a seemingly endless expanse of field. In another photo, hundreds of cars—all black sedans—are parked haphazardly in another part of that field. The caption reads, "Careful plans must be made for handling cars." It's hard to figure from the photo where the care and planning came into play, but it must have been good enough for 1941. The author writes that it's better to travel an extra 5 miles to a site than it is to settle for a field that's surrounded by houses or woods. Today's version of that statement?—Plan to travel at least 50 miles to a field, and hope that all you have to contend with are a few houses and some trees.

FIELD DAY

For those who preferred to spend more time on the flying field than in the workshop, the Pacer—a light, high-performance Class B gas model—would have been a good choice. Author Sal Taibi considered it an easy plane to build—35 hours of labor, and he figured you'd be heading to the field. There were no sides to build (you didn't have to insert uprights and diagonals and wait for them to dry), and the stab and rudder were built flat. The wing, however, was time-consuming: it was sheet-covered and cap-stripped. The wingspan was 53 inches, the wing area, 440 square inches and the total weight was 25 ounces. Mr. Taibi is shown with his Pacer in Poughkeepsie, NY, where he achieved a flight time of 13 minutes, 20 seconds, using a Forster 29 motor.

The Ercoupe was another model that would have made that extra 5 miles to the field seem worth it. "You can see how radical it is with its tricycle landing gear and twin rudders. It looks more like a modern pursuit ship than a light plane." Apart from the fuselage, it was thought to be an easy-to-build, stable flier. There were two approaches to the fuse: the half-shell method, which was best for beginners, and the master-stringer method. After a small rudder adjustment, this ship flew perfectly. Six strands of 1/8-inch rubber were used for power in the original model, but if you made the Ercoupe light enough, you got away with fewer strands.

The Republic Guardsman—a multipurpose, two-seat, low-wing monoplane—was on the cover. The pilot sat well forward behind the large, radial, air-cooled motor, and the rear gunner was positioned in

How to park at a flying field in 1941.

Sal Taibi with his Pacer, which flew for 13 minutes, 20 seconds.

the middle of the fuse. The plane was equipped with forward and rear firing guns, retractable landing gear, bomb racks and signalling equipment. The fuse was built up on a series of pressed aluminum-alloy channel-type formers, and the wing was built in three sections. This heavily loaded combat plane had a single, 750-pound demolition bomb mounted below the fuse between the landing gear and six, 100-pound fragmentation bombs mounted in threes under each outer wing panel. The wingspan was 36 feet; its overall length, 26 feet, 10 inches; and its wing area, 225 square feet including ailerons. The wing loading was 26.7 pounds per square inch, and the top speed, fully loaded, was 315mph.

"Frontiers," the column that reported on aviation development, was packed with information. American airplane production plants were in high gear as they tried to keep up with demand. "It's impressive to see the rows of Douglas Bostons arrayed in their camouflaged war paint lined up on the field ready to be delivered to a country at war. It's even more impressive to watch one take off on its first test hop, or to see them leave for Canada en masse."

Gene Autry admires the "Gene Autry Special."

A PLANE NAMED "GENE"

In the "Gas Lines" column, Gene Autry is shown admiring the "Gene Autry Special"—a gas job designed

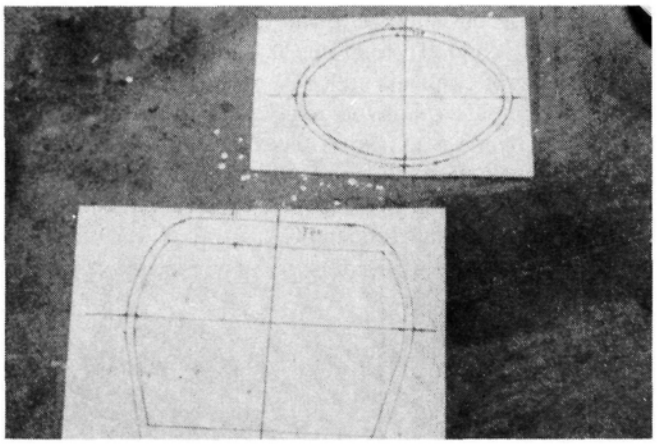
(Continued on page 125)

QUICK-BUILD A Fiberglass Cowl

This alternative to balsa is easier to make than you may think!

by BRUCE HALL

WHILE CONSTRUCTING my latest plane (an Ace 4-40 Bipe), I realized how much better it would look with some type of engine cowl. I read an article about building a balsa cowl, but I wanted something that was less likely to become soaked with fuel. I decided to use light, durable fiberglass cloth saturated with CA. I was so pleased with the results that I wanted to share the process with other modelers.

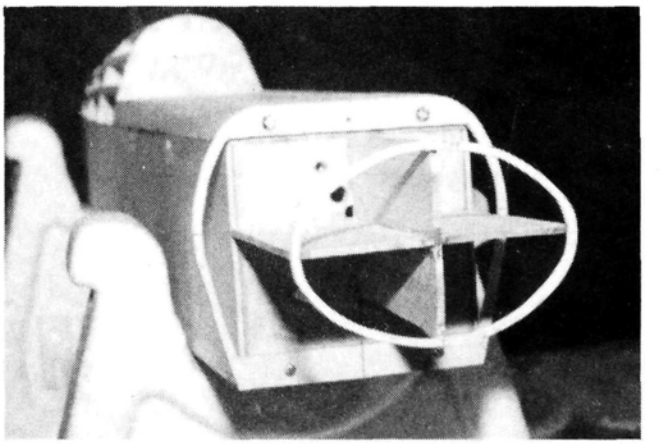


1. To start, decide which type of cowl would look good on your plane. Sketch the outline on the plans, allowing 1/16 inch between the front of the cowl and the back of the prop or spinner. If your plans show an engine, great!—if not, measure the distance from the rear of the engine mount to the rear of the prop and deduct 1/16 inch. This will be the length of your cowl.

You'll need front and rear formers. To make a pattern for the rear former, stand the fuse on its nose and trace around it on a piece of paper. Find the thrust line on the outline, and draw both a horizontal and a vertical line through it. This will help you to align everything later.

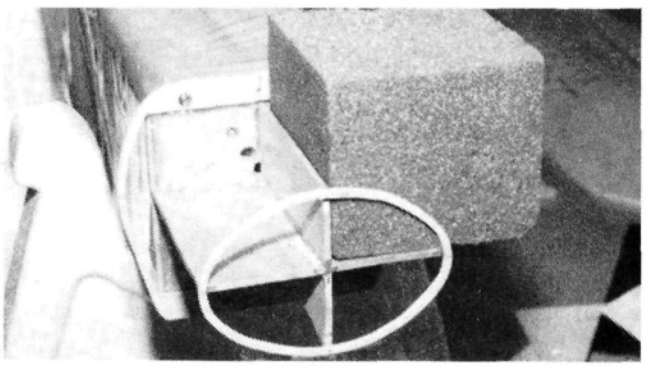
Next, draw the shape of the rear of the cowl on the outline. You'll have to cut out the inner part later, so draw a second line inside the first. Be sure to make the former wide enough to take the screws that secure it to the firewall. (My rear-former pattern is wider on the top and bottom, because that's where I installed the screws.)

To make a pattern for the front former, draw a horizontal and a vertical line on the paper. Where these lines intersect will determine where the thrust line is. Now draw the shape of the front former over these lines. (As you can see, I drew my former so that the thrust line was located in the center of the oval.) Cut out the patterns for the front and rear formers, and trace their outlines onto 1/8-inch plywood. Make sure that the thrust lines are transferred as well, and then cut out the wooden shapes.



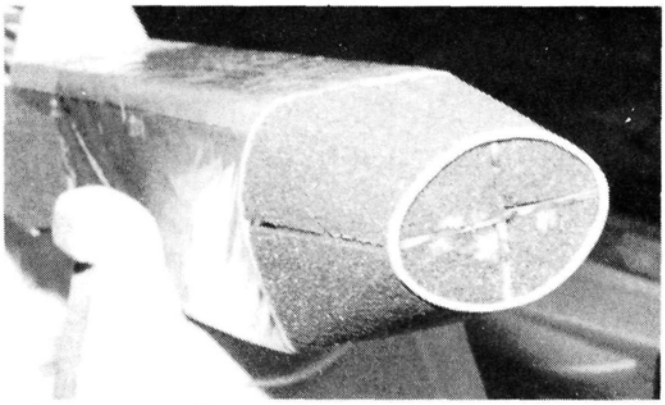
2. Draw the thrust lines on the plane's firewall, and align them with those on the rear former. Drill holes, and mount the rear former to the firewall with socket-head screws.

To position the front former, make a crutch out of scrap balsa. Cut the balsa pieces to the correct length, allowing for the thickness of the front former and the 1/16-inch clearance. Use a triangle to keep the balsa pieces as square as possible, and "spot glue" them to the firewall on the thrust lines. Glue the front former onto the crutch, making sure the thrust-line marks on it align with those on the crutch and the rear former. To double-check the length of the balsa crutch, measure from the firewall to the front of the former.

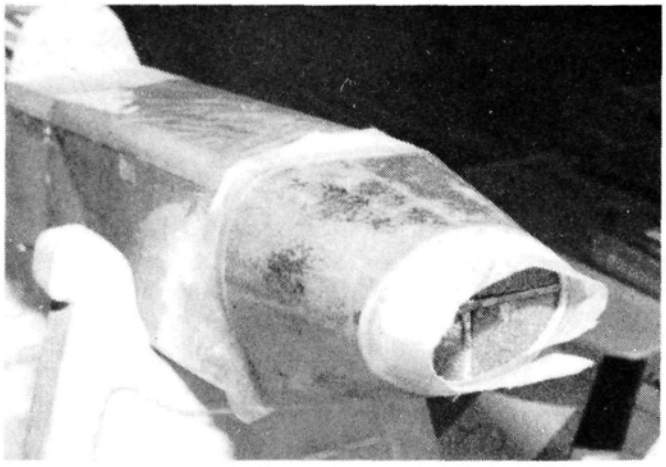


3. To complete the next few steps, you'll need foam, Hot Stuff* UFO CA, 6-ounce fiberglass cloth and plastic wrap. Cut a block of foam to fit between the front

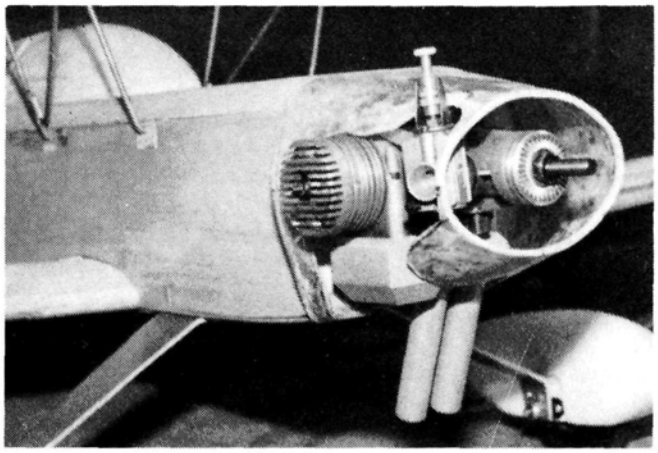
and rear former in each of the four sections, and glue them to the crutch with UFO. (Any type of foam will work, but I use the kind that florists use in arrangements, because it's very porous and easy to shape.)



4. Using a knife, roughly cut the foam to the shape of your cowl. Finish it by sanding lengthwise with a 100-grit sanding block until you hit both formers. This will give you a smooth surface on which to glue the cloth.

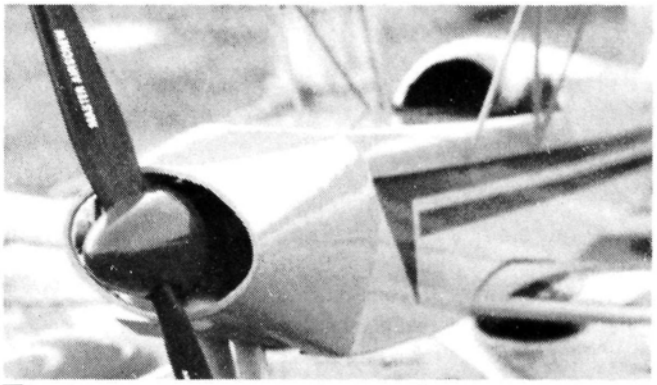


5. To prevent the fiberglass cloth from sticking to it, cover the fuse behind the rear former with plastic wrap. Spray one side of the cloth with 3M 77 glue, and wrap it around the cowl, making sure it's glued to both formers. When it's dry, saturate the cloth with UFO thin CA, just as you do when you reinforce the center of wings.



6. When this has cured, trim off the excess cloth and dig into the foam until you can reach the screws. Take the cowl off the fuse, and then start to remove the rest of the foam. Break out the crutch, and finish cleaning out the inside of the cowl. To reinforce it, coat the inside with another layer of cloth and either CA or epoxy.

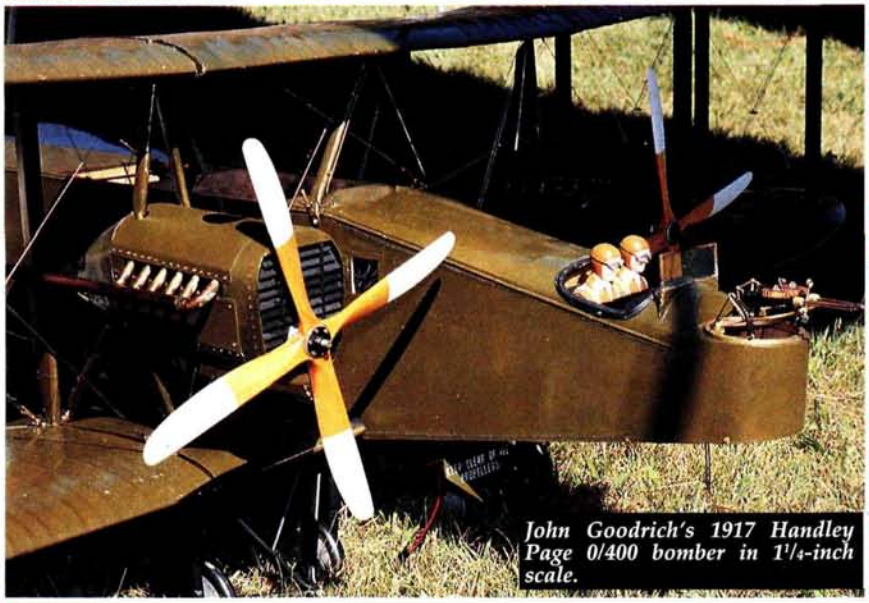
Make cutouts to suit your engine, and finish and paint the cowl, or cover it with film. (I chose the latter method, as my paint didn't match the film I was using.) It's easy to add blisters or cheek fairings that have been carved out of balsa or built-up of foam, cloth and CA.



7. As you can see, a cowl can really spruce up a sport plane's looks. Try this method on your next project. I know you'll be pleased with the results—and when someone on the fight line asks where you got the cowl, you'll be able to say, "I made it!"

Here's the address of the company mentioned in this article:* ***Hot Stuff,* *Satellite City, P.O. Box 836, Simi, CA 93062.* ■

Nick Tusa's 1/3-scale Fokker D7 with 10-foot span and O[illegible]



John Goodrich's 1917 Handley Page 0/400 bomber in 1¼-inch scale.

Rhinebeck 90

THE OLD Aerodrome in Rhinebeck, NY, is always a fascinating place to visit. It's probably the only place in the world where authentic full-size WW I airplanes can be seen flying on the same day as their miniature counterparts. For

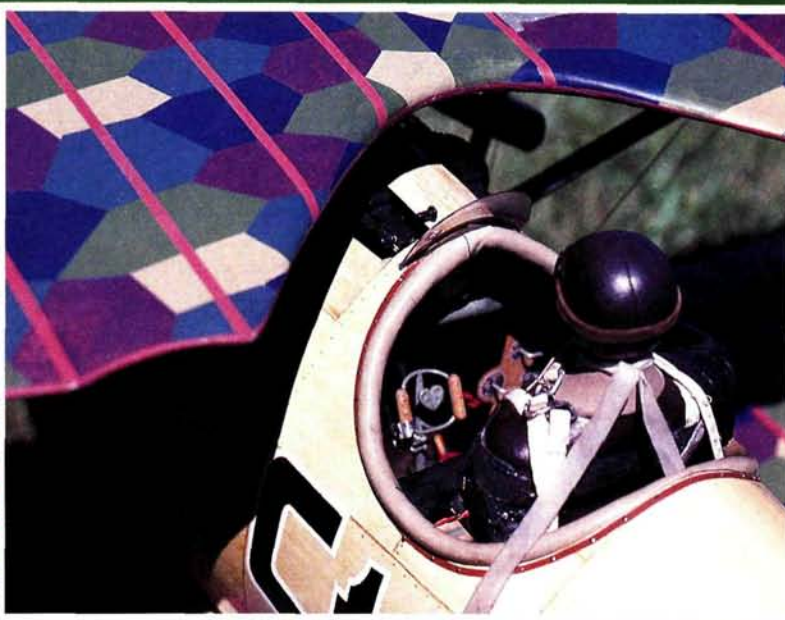
by FRANK GUDAITIS

A closer look at five, scale, early warbird masterpieces

over a quarter of a century, Colen Palen has brought these historical aircraft to life, and for almost as many years he has welcomed R/C modelers to his aerodrome.

The 1990 Jamboree held at the Aerodrome last September drew 107 contestants. As in years past, the Mid-Hudson R/C Club did a superb job of

The show never fails to draw a large crowd; here's just a part of the action.



Two photos of Tom Polapink's scratch-built 1/5-scale German Albatros D5a. It has a 6-foot span, a 4-stroke O.S. 120 engine, and it's based on Tom's research at the Smithsonian. Note the cockpit detail.

PHOTOS BY FRANK GUDAITIS

hosting this memorable contest. Thirty-two volunteer judges had the formidable task of observing over 600 flights in two days (47 were giant-scale aircraft). The Jamboree consisted of five major events: AMA Scale, Combat, Giant Scale, Maneuvers and Mission.

There were many excellent examples of model building, but the most impressive were the giant-scale planes, whose owners went to great lengths to build them accurately. Rather than give an overview of the entire Jamboree, I've singled out five of these elegant 1/3- and 1/4-scale models for this report.

• The twin-engine 1917 Handley Page 0/400 bomber in 1 1/4-inch scale was an extraordinary effort by John Goodrich of South Burlington, VT. He spent 18 months researching the details and 12 months constructing this work of art. With a wingspan of 125 inches and a chord of 12 1/2 inches,

Bud Roane's Thomas Morse Scout S4-C placed 1st.

it has a wing area of 17 1/2 square feet. At 16 3/4 pounds, the wing loading is 15.3 ounces per square foot. (The full-size bomber had a wing area of 1,620 square feet, a wingspan of 100 feet and a wing loading of 8 1/4 pounds per square foot, and it weighed 13,360 pounds.) Like the original, the model's wings fold back along the fuselage so that it's easy to transport and store.

The model's cockpit is fully detailed with instruments, and the front gunner is shown with twin, Lewis machine guns mounted on the nose. The full-size plane was powered by two Rolls Royce Eagle liquid-cooled engines; John's model carries two O.S.-48 air-cooled engines. In addition to the usual flight and engine controls, he uses a Futaba radio to signal a bomb drop.

Rich Feroldi's 1/3-scale Sopwith Pup has a 9-foot wingspan and is powered by a Kawasaki 3.15 2-stroke with spark ignition. It has accumulated 350 flights since 1983, with a total flying time of approximately 60 hours—perhaps a record for longevity.

• Of all the R/C scale models that I've seen, none has approached the realism of Nick Tusa's 1/3-scale, 10-foot-span Fokker D7. The Fokker D7 was probably the best German fighter to emerge from WW I. It was so formidable that further production was forbidden in the Versailles Peace Treaty. Nick's quest for accuracy compelled him to draw his own plans from a 1917 German three-view factory plan. His plane's weathered appearance is faithful to the battle-worn look of its full-size counterpart.

Apart from the Quadra 65 engine and the Futaba radio, all parts (including the pilot and the high-altitude oxygen equipment) were handmade, and each camouflage lozenge was also hand-painted. The airplane made over 40 flights, won several contests and qualified for the U.S. Scale Masters. At Rhinebeck, it placed 2nd and scored the highest static mark—98.2!

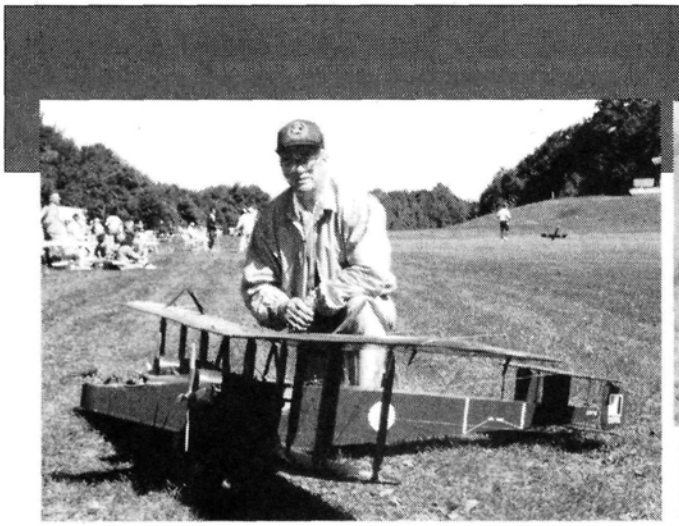
• Back in the Allied camp, I found Rich Feroldi's 1/3-scale Sopwith Type 9901, popularly known as the "Pup." It weighs 35 pounds, has a wingspan of 9 feet, and was powered by a Kawasaki 3.15 2-stroke engine with spark ignition. It has set many records with longevity perhaps being the most significant.

Rich built this plane from a Balsa USA kit. He started building it in 1982 and flew it for the first time a year later. Since then, it has accumulated about 350 flights, with a total flying time of roughly 60 hours. Rich figured that this would probably add up to enough mileage to fly from New York City to Los Angeles. The Pup has flown at every Rhinebeck Jamboree since September 1983. This year, he placed 4th in the Giant-Scale event. The flying characteristics of this model are extremely realistic, and it's always a pleasure to watch it aloft.

• Tom Polapink had a beautifully detailed 1/5-scale model of a German Albatros D5a fighter. Its wingspan is 6 feet, and it weighs approximately 12 pounds. It uses a 4-stroke O.S. 120 engine and carries a Kraft radio. Tom's Albatros was entirely scratch-built from plans that he drew after doing some research at the Smithsonian Institute. The colors and markings match those of the full-size Albatros that's now in the National Air Museum.

Tom's Albatros has flown in the past three Rhinebeck Jam-

Bud Roanes' 1/4-scale Thomas Morse Scout is powered by a Quadra 35 and has a wingspan of 6 1/2 feet.



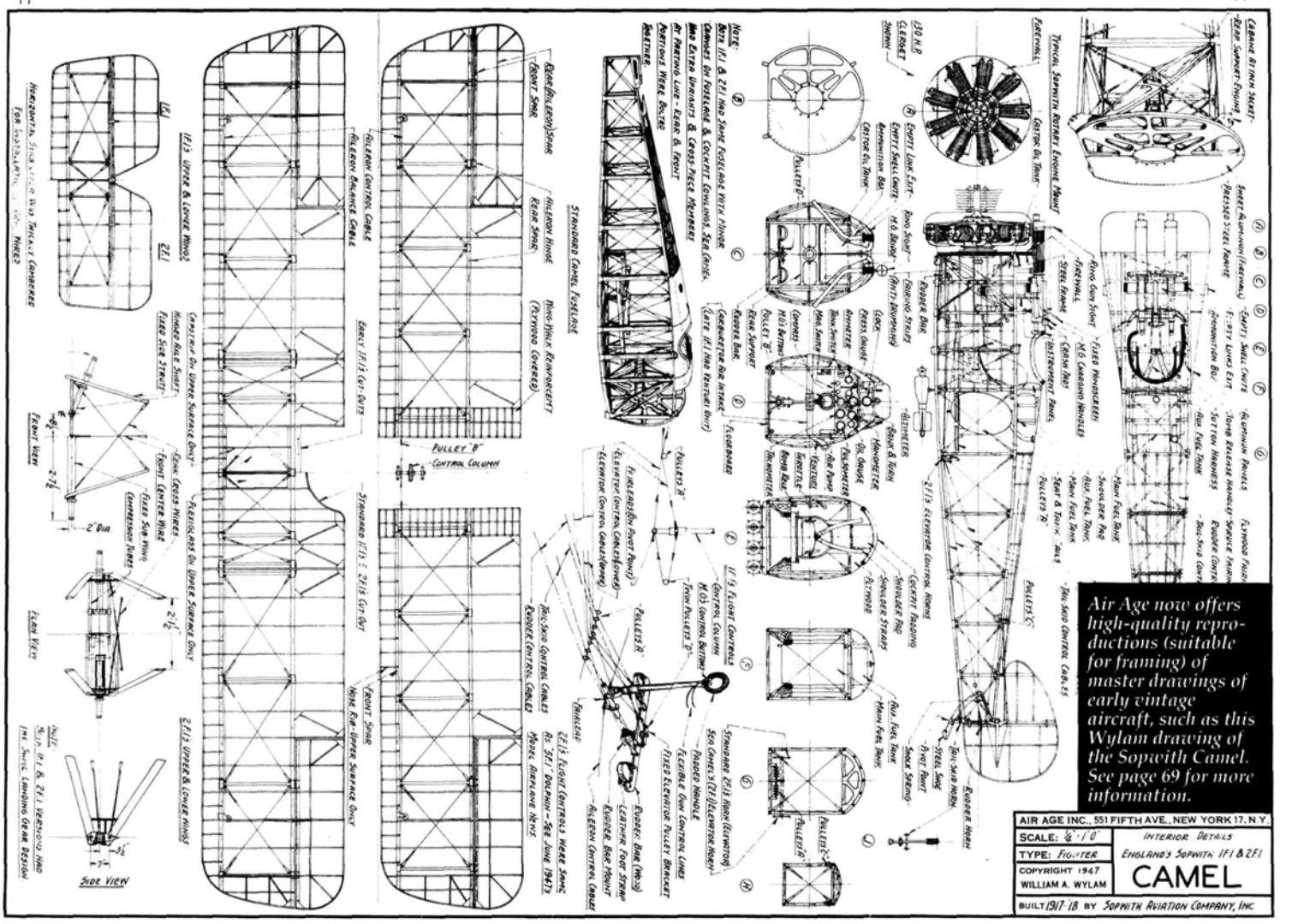
Left: John Goodrich's Handley Page bomber is powered by two O.S. .48 Surpass 4-stroke engines and spans 125 inches. Right: Nick Tusa's Fokker D7 shown planting one wheel on landing! It flew really well!

borees, and it has survived 25 flights. As in the previous year, it placed 2nd in the AMA Scale event. This exceptional model appeared in a TV commercial and in a Hollywood feature film called "The Hard Way." (This title also describes how Tom achieves his excellent workmanship.)

• Last, but by no means least, is Bud Roane's 1/4-scale Thomas Morse Scout S4-C. During WW I, it was the only American fighter made in series production. Primarily used as a trainer, it was never used in combat. Bud's S4-C was the 1st-place winner in the 1990 Giant-Scale event. During the 18 years that Bud has flown his models at the Jamboree, the Scout has won 1st place three times and 2nd place and 3rd place, once.

Built in approximately six months from the original 1918 factory blueprints, it has a wingspan of 6 1/2 feet, weighs 22 pounds, and it's carried aloft by a Quadra 35 engine. The controls are actuated by a Futaba 7FGK radio with nine servos, and the rudder and ailerons are coupled together.

If you have an opportunity to attend the Jamboree, don't pass it up. These extraordinary models must be seen to be believed. ■



COVERING FILMS

(Continued from page 57)

through the wing covering, drill holes in all the ribs before assembling the wing. This lets hot air escape through the servo well or the wing tip rather than through the covering. On flat surfaces, make a pinhole in the covering at the tip of the part; this usually allows enough air to escape when you shrink the film from the root toward the tip.

If your iron is too hot, or if you leave it in one place for too long, small bubbles will form between the film and solid-sheet surfaces. The solution is to prick one side of the bubbles with a pin and, using a cooler iron, smooth the air out, starting at the side opposite the hole. Putting a cotton sock or other cotton covering over the iron helps to eliminate bubbles and keeps the iron from scraping and scratching the film.

Wrinkles that have been accidentally ironed in (like pleats) are more difficult to eliminate in some films than in others. Generally, the low-temperature films are the most forgiving, and their instructions explain how to eliminate wrinkles.

HINGES

You can use film covering to make hinges for control surfaces. Simply iron two strips of film together with the glue sides overlapping about an 1/8 inch, then slice "half-hinges" from this strip. To make the hinge, iron a half-hinge from the bottom of one surface (e.g., wing) to the top of the other (e.g., aileron). Put the second half-hinge adjacent to the first, but iron it onto the opposite side of the surface. Space the hinges about every 3 inches along the hinging area to provide a very tight hinge line at a very low cost.

LOOKS CAN DECEIVE

Don't be misled by their appearance! Plastic films *do* increase the strength and rigidity of the surfaces they cover, and they're less expensive, easier to use and more forgiving than any "old-time" method.

Here's the address of the company that manufactures the products mentioned in this article:* ***Micafilm, Balsarite and Presto* *are products of Coverite, 420 Babylon Rd., Horsham, PA 19044.* ■

SPORTY SCALE

TECHNIQUES

by FRANK TIANO

Scale Masters 1991, Top Gun, Unlimited Races

MY LIFE IS hectic, but I'm excited about sharing some good stuff with you. Why hectic?—because I'm in the process of moving my home and my business to a new location, and it hasn't exactly been easy! For those who care and those who are just plain nosey, my new address and phone number top the list at the end of this article. Your response has been out of this world, and I don't want to miss any of your letters.

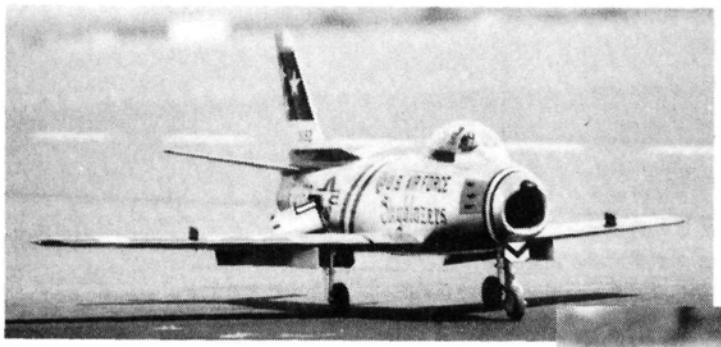
SPORTY SCALE AT THE SCALE MASTERS

Rich Uravitch covers the Masters for us elsewhere in this issue, but Mike Richardson took some really great shots that I think you should see. Among the most impressive is one of Bill Carper's P-47 pulling up its gear, moments after taking off. One of my favorites, the P-47 has been kitted many times, but unfortunately, most renditions have been loaded with mistakes that prevent an outstanding airplane from being a work of art. I'm happy to report, however, that an old friend is now designing a true-scale P-47, and we'll be building the prototype in our shop. I promise to keep you posted. All I can let out of the bag right now is that the bird will be exactly 1/6 scale; will use anything from a Super Tigre 2500 to an O.S. 3500 or a Bully for power; and will be made primarily of wood with a few fiberglass parts. It will be a basic kit, but all the extra details that the real enthusiast just must have will be in there, too. How true-to-scale you want to make this airplane will depend on how much time you want to spend on it.

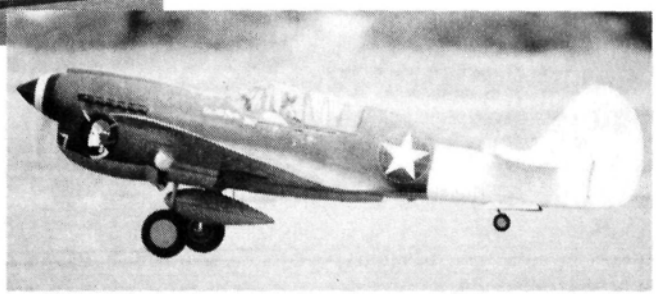
At both the Masters and last year's Top Gun, more than half the entries were built from plans. At the Masters, Mike caught some excellent renditions during the first round of flying, but few were prettier than Bill McCallie's P-40 (Tampa, FL), shown here just seconds after takeoff. Jerry Bates drew the plans, and it's just the perfect size.

Speaking of P-40's, I was pleasantly surprised to see that someone finally grabbed a Byron Warhawk and did it justice. Al Kretz had a gorgeous one, and he proved that a well-built kit can do well in "static" if you do your homework. Another great subject was the Japanese Val, designed and built by Doc Keith. As well

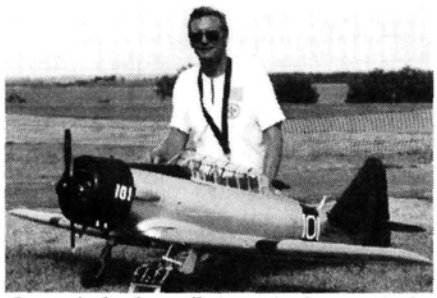
Jerry Burpee did a magnificent job on this twin Beechcraft. Notice the cowl flap and rivet detail. The dummy engines are works of art.



Skyblazer #1 taxiing back to the hangar. Ron Gilman's F-86 is hard to beat in any category. See how realism can be increased with scale landing gear, flaps and dive brakes?



You'd never know there was a brutal crosswind blowing at the time Bill McCallie's P-40 got airborne. The S.T. 2500 flies the 20-pound, 80-inch beauty with power to spare.



One of the best-flying airplanes at the Masters was Tom Street's Ziroli T-6. You'd never guess he covered it with MonoKote! Thrust line is slightly too low, Tom.

Bill Carper is always in, around, or sniffing at the winners' circle. He builds pretty airplanes and flies them well. He built this one from a Bert Baker kit.

as being one of the prettiest planes in competition, it flew very well. Doc went on to prove that you don't have to make a WW II fighter with retractable gear to do well.

Ron Gilman felt the agony of defeat when a glitchy servo caused a premature tank salvo at exactly the wrong moment—three times! His Top Gun-winning F-86 was still a joy to watch, especially when he made that low speed flyby with the flaps down, the gear extended and those speed brakes hanging out! Has scale modeling come a long way or what? I can vividly remember when you were a success if you entered a model that was even *70 percent* scale and you took *50 percent* of it home with you at the day's end. Now we have super scale jets with a performance envelope of 25-170mph, and anyone with some pattern or simple scale experience can master them.

Some guys tried a new idea at this year's Masters, and they might have unwittingly paved the way for a new competition category. It seems that about eight pilots arrived, entered, and had "static-judged" models that they had no intention of flying! They just wanted to see how well their ships would score in the "static circle." Armed with a knowledge of where they failed, they went home to correct their errors and prepare for the next contest. If nothing else, you must admit the idea is interesting.

Just imagine: during cold or windy weather we could have static contests and promote this great sport while getting in some low-stress competition. Jerry Burpee did just that in Texas. Just take a peek at his fantastic Beechcraft E-18S. There are some truly amazing details on Mr. Burpee's model, *most* of which I'll tell you about next month.

1991 FREQUENCY ADVICE

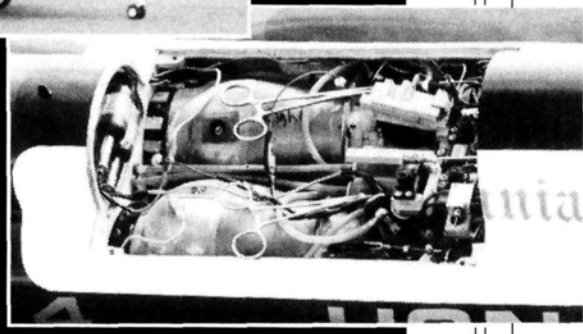
While I was talking with Bob Underwood the other day, he casually asked whether Top Gun would be adopting the new AMA frequency rules or, like many U.S. clubs, would we allow pilots to use older, non-gold stickered receivers until 1993, when the FCC recognizes our frequency policy. I assured Bob that at Top Gun, *all* pilots *must* have up-to-date, narrow-band, 1991-legal equipment, or they simply won't be allowed to fly.

It seems that there has been a lot of controversy and even more misunderstanding about this 1991 thing, so maybe it's about time that Uncle Frankie tells it in 100 words or less. If what I say makes sense, please tell all our scale buddies so they don't lose a new bird because of a lack of communication! Here goes!

The AMA *strongly recommends* that you use narrow-band equipment after January 1, 1991. The FCC won't *enforce* the narrow-band requirement until January, 1993. Those who want to fly their old equipment for a while longer will be going against the wishes of the AMA, but they won't be breaking any FCC laws until 1993. Many clubs are allowing this because they have

Mr. and Mrs. Linton Keith—we call him "Doc." They came prepared to play and even had matching outfits. The Val was nice, too!

This Jet Model Products F4 has two KBV 82 engines running Dynamax fans, two on-board Nystarters, lots of servos and 130 feet of hookup wire.



FABULOUS PHANTOM

So, you want to build and fly a Phantom? Looks easy enough, right? Big bird, plenty of area. Tom Cook of Jet Model Products* still makes a kit (priced right, engines are readily available, radios are pretty trouble-free). You have the desire, the experience and the enthusiasm. Oh yeah, the bucks, too! So go ahead and *do it.*

Shailesh Patel of Eureka, CA, did it—came over from WW II fighters. Only took him three flights to familiarize himself, but he does admit he's still learning. The 22-pound bird flies like a big sport ship as long as both fans are kept turning. If one quits? Simple: land it. Nothing prettier than a Phantom and nothing sweeter than two fans screaming their hearts out. Oh yeah, while you're at it, take a night course in electronics and wiring. Come to think of it, a refresher course in plumbing might not be a bad idea, too!

many members who don't want to spend the dollars to upgrade their systems. Well, let me tell you something. This is just like playing Russian roulette! Many aspects of radio interference and modulation are far beyond the underinvolving old *wide-band* receivers! Trust me! Spend the $60 to $90 and make your planes bullet-proof—and then convince your flying buddies to spend the bucks, too. Until we *all* fly narrow-band radios, nobody's bulletproof!

Top right: British SE-5A is a handsome early fighter with excellent ground handling. The mate to the Fokker, with the two, a couple of flying buddies could stage their own WW I combat. Not as colorful as the Fokker, but it was very pretty in shades of green and brown. Above: a red fuselage and a camo wing—just one of several hundred paint schemes that are available for the 75-inch Fokker D-7 from Col. Stunning Plans. The cowl and detail parts are included in the plan package.

STUNNING PLANS

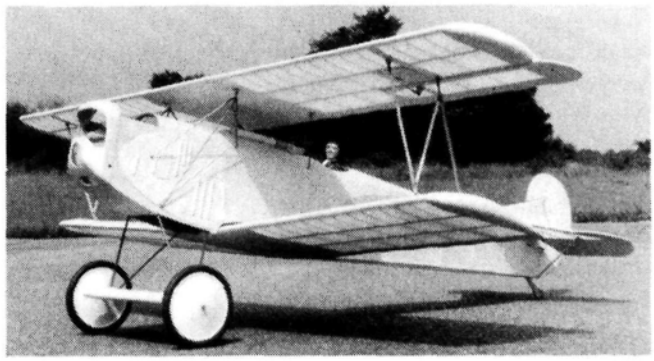
Previously, I mentioned that I had been in contact with Rich "Col. Stunning" Uravitch*. Well, it seems that the Colonel hasn't been idle. He just sent me some photos of his latest creations—a couple of 1/5-scale WW I warbirds that offer a somewhat slower, narrower envelope than a Tom Cook Starfire. Although not as racy-looking as a Starfire, these 75-inch biplanes do have what it takes to grab a fair share of "ooohs" and "ahhhs" at any field.

Every scale modeler recognizes the Fokker D-7 and the British SE-5A; flash color schemes are readily available. These designs have an inherent bonus in that they're easy to build, are large enough to qualify as "giant scalers" and can use a wide variety of powerplants, from a .90 2-stroke to a 1.20 4-stroke, or a gas burner of the 2-cubic-inch variety. They're not exactly to scale, and you don't have to belong to the "white-knuckle brigade" to fly them. They *are* extremely robust, easy to handle and probably a great stepping stone toward that high-performance, fire-breathing Mustang you've had your eyes on for the past few years. I hear that a pair of these warbirds took 3rd in Combat at this year's Rhinebeck WW I Jamboree. Give the Colonel a buzz if you'd like a set of the plans. For $36.95, you get not only the plans but also a parts-layout sheet, instructions and some vacu-formed parts like a cowl and stuff.

TOP GUN TALK

I promised to keep you abreast of any developments in plans for the Top Gun Invitational, which will be held on May 2 through 5 in West Palm Beach, FL. Here's the deal. Most people are coming in on Wednesday for the first day of static judging (Thursday). Serious parties are planned for Thursday and Friday evenings and a dinner/dance happening for Saturday night. We've capped out at 52 pilots and 10 team scale entries. In the unusual department, we have the world's best female pilot competing in an otherwise male field. Also unusual is the promise by one of the team scale entrants to show us his B-70 ducted-fan bomber.

The hobby industry is again offering all kinds of support, and major manufacturers will set up trade-show-style booths. For the first time ever, a national airline has offered help: American Airlines is the official Top Gun airline, and I urge you to use their services. For travel arrangements into W. Palm Beach, call our friend, Cindy Burkey at Davie Travel*, or you can call AA* and make your own arrangements (mention Top Gun and the file name: STAR 0141FV). The Palm Beach Polo Club offers luxurious condominiums at ridiculous rates, and we have alternative hotels at even lower rates. You may write to me for information, but I can answer only requests accompanied by a legal-size SASE. It's going to be a wonderful Top Gun.



The basic structure of the Stunning Plans Fokker D-7. Super Coverite makes an excellent base for your choice of color scheme. Williams Bros. wheels fit perfectly and increase realism.

Once again, we'll be given worldwide magazine coverage and a lot of network TV attention. Most of your favorite pilots will be there. In

(Continued on page 138)

HELICOPTER SECTION

C O N T E N T S

In this issue, Larry Jolly reviews the amazing Robbe Autogyro—a rotor-craft that's neither plane nor heli. Craig Hath continues his treatment of heli fundamentals with a discussion of Tail-Rotor Torque Compensators, and he also brings you full coverage of the 8th Annual West Coast Radio Control Heli fly-In.

Photo above: An Apache helicopter in mid-maneuver. Photo courtesy of "The Illustrated History of Helicopters," Publications International Ltd.

PAD & BENCH REVIEW

Neither plane nor heli, this rotor-craft flies well and turns heads!

by LARRY JOLLY

MANUFACTURED BY ROBBE* Schluter, the Whopper is a .60-size autogyro based loosely on the designs of Juan de la Cierva, who manufactured full-size autogyros in the '20s and '30s.

What's an autogyro? It's a special breed of rotor-craft that's halfway between a helicopter and an airplane. Although an autogyro has a main rotor, it's unpowered, except before takeoff. Because the rotor is always autorotating (think of it as gliding in flight), there's little torque and, hence, no need for a tail rotor. The rotor creates lift when it's dragged through the air by the powered fuselage. Although an autogyro can't hover, like a helicopter, it can fly very slowly and land in very small areas. We don't see many full-size autogyros today because their performance falls exactly between that of helicopters and airplanes. Being slower than fixed-wing aircraft and incapable of hovering, they aren't as attractive as either. Autogyros do, however, have unique flying characteristics, and they're a lot of fun to fly.

Although closely related to the helicopter, the Whopper doesn't require a special helicopter motor or a special radio. With a rotor diameter of 58 inches and a height of more than 20 inches, it's designed to accept most .60-size motors. Ready for flight, it weighs 10 pounds, and it requires a 5-channel radio for steering. It isn't as challenging as a helicopter, so the Whopper might be just the ticket for a fixed-wing or heli pilot who would like to show up at the field with something different.

THE KIT

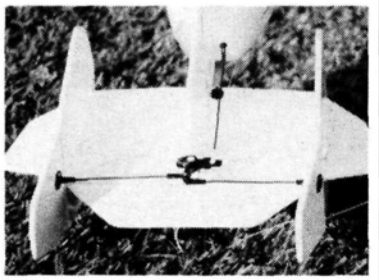
Schluter has been making R/C helicopters

ROBBE

Whopper

for a long time, and the high quality of this kit exemplifies Schluter designs.

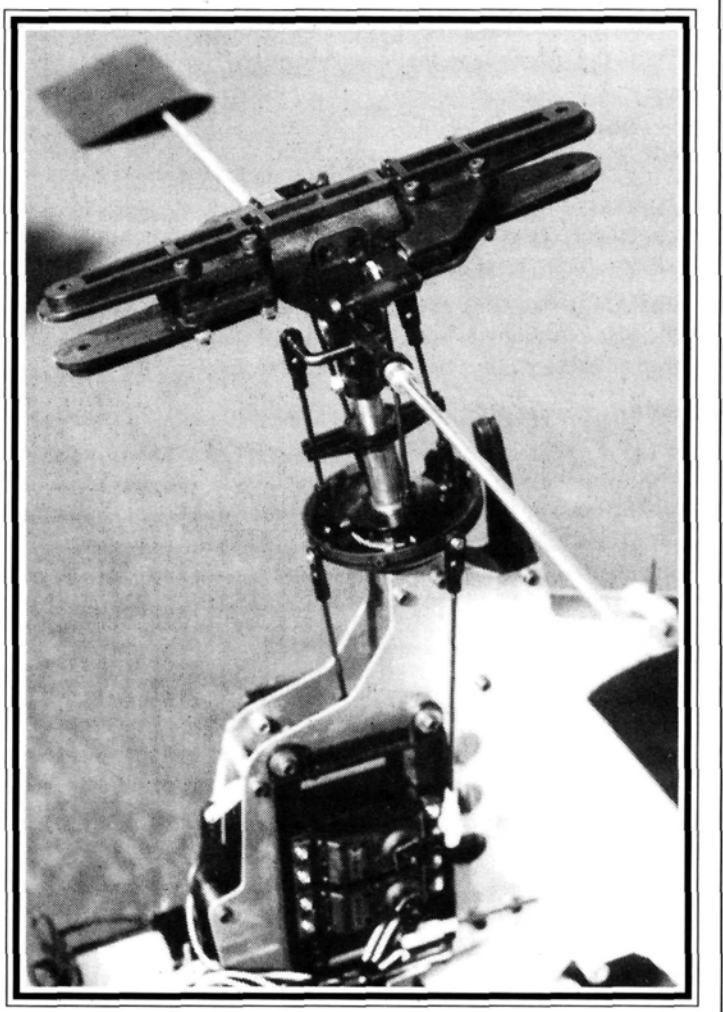
The Whopper's mechanics consist of two aluminum plates that hold the motor, the fuel tank, the servo trays and the rotor-drive assembly. To this basic power unit are attached the robust main landing gear and rectangular aluminum tail boom. The wooden tail assembly is attached to the tail boom. As you'll see in the photos, the individual assemblies are all attached to this inner framework and then covered by the plastic fuselage that slips over the completed assembly to increase the Whopper's scale realism.



In flight, left rudder trim is needed to counteract the slight torque transmitted by shaft and bearing drag; use 5/8-inch offset and be ready to use rudder in turns!

Schluter supplies three large prints that show the assembly details, and by following these and the 8-page manual, you'll find assembly rapid and easy. The sub-assemblies are numbered to correspond to numbered bags that contain all the necessary parts and fasteners for a particular assembly. (There are only 14 basic steps.)

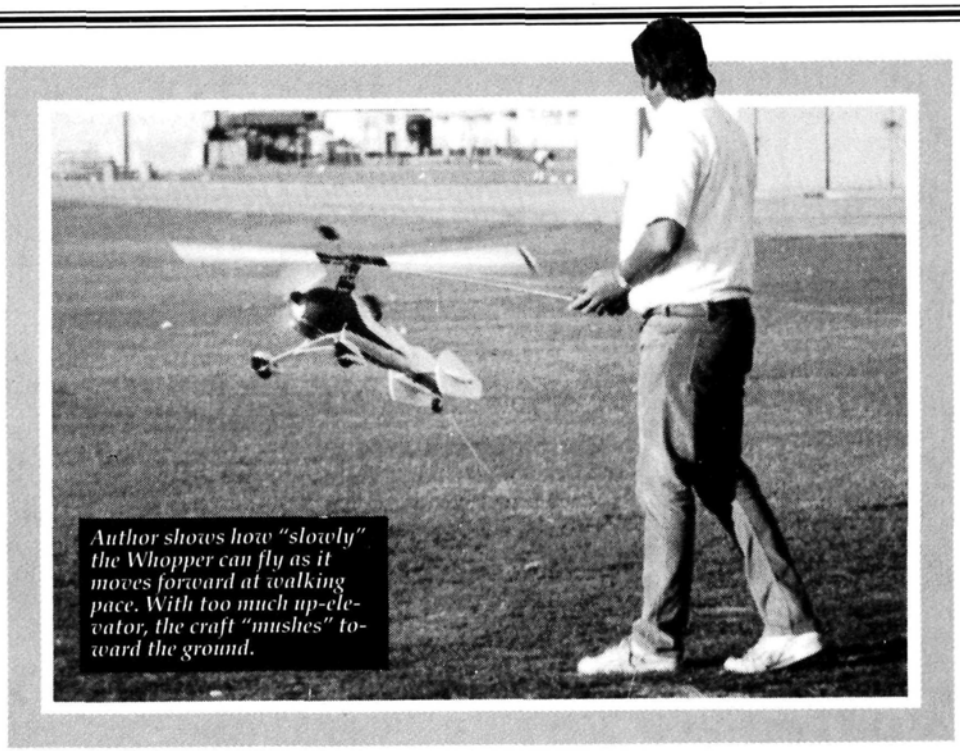
• **The rotor-drive assemblies.** When you've assembled the main side frames, assemble the rotor-drive assemblies. Although an autogyro's rotor is unpowered in flight, it's common practice to spin it before takeoff. This allows a much shorter takeoff run. One result of this "pre-spin" feature is the rotor-drive assembly, which consists of a nylon drive gear that's driven by a gear mounted on the motor.



The Schluter system 88 rotor head keeps blades in track without any apparent vibration.

The main gear is attached to a shaft that has an aluminum cone on its other end. When the engine is operating,

Whopper



Author shows how "slowly" the Whopper can fly as it moves forward at walking pace. With too much up-elevator, the craft "mushes" toward the ground.

this shaft turns. Mounted aft of this drive shaft, there's a corresponding shaft that's connected to the main-rotor drive gear. Before takeoff, a servo-operated lever drives the first cone into an inverted cone that's mounted on the second shaft. This assembly acts as a clutch to engage the pre-spin unit, and it works very well: the cones and the slide assembly are kept in position by small Allen setscrews. I mark the final position of each setscrew and then file a small flat on the shaft where the screw seats. This prevents the parts from slipping and definitely cuts down on maintenance!

• **Mounting the motor.** For power, I chose my old, reliable O.S.* .61 FSR. Use a reliable motor with a good idle that can swing a 12x6 prop at a reasonable rate.

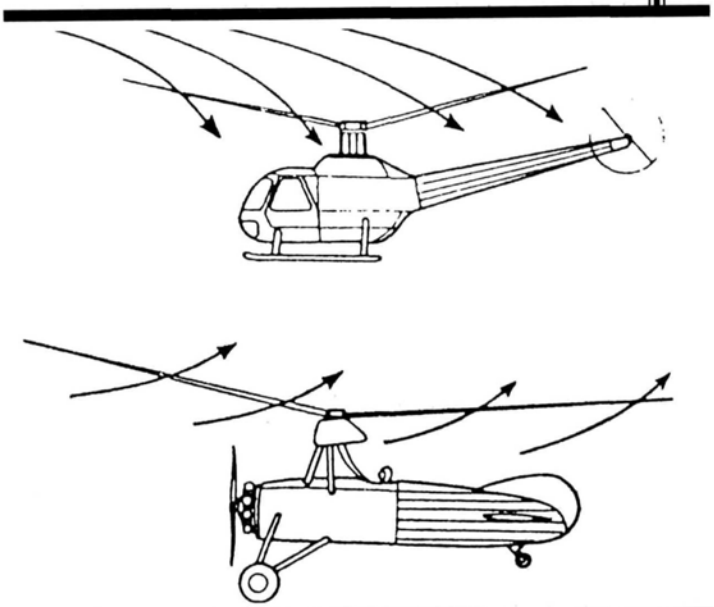
The Whopper uses a Futaba 7GH heli transmitter, a Du-Bro Spinner and an O.S. .61 FSR.

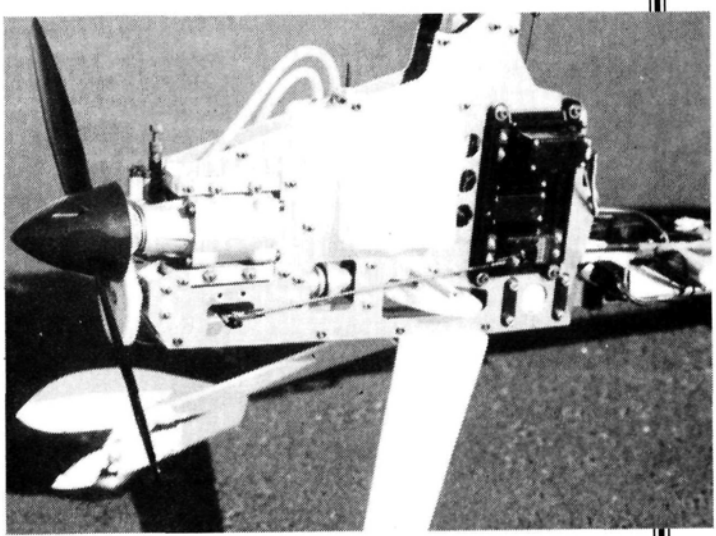
Your Whopper's motor will spend most of its time at half throttle and less. Before you drill the mounting holes, carefully check that your motor is in the proper position.

• **Assembling the rotor head.** This goes together easily and precisely. The Whopper uses the system 88 rotor head that we've seen on the proven Magic Series. If one paddle seems to weigh more than the other, check to see whether a ball link has slid into it. The paddles are hollow and open ended, and one of mine had two ball links stuck inside it. (This happened during shipping.)

• **The tail assembly.** Push the tail-wheel wire into the tail boom as far as it will go. The excess on the upper surface acts as the pivot for the rudder-actuation mechanism. I finished the wooden tail surfaces with K&B* Superpoxy paint and resin. The Whopper has twin rudders that are actuated simultaneously, and the mechanism is slop-free and easy to adjust.

• **Assembling and mounting the fuel tank.** The motor



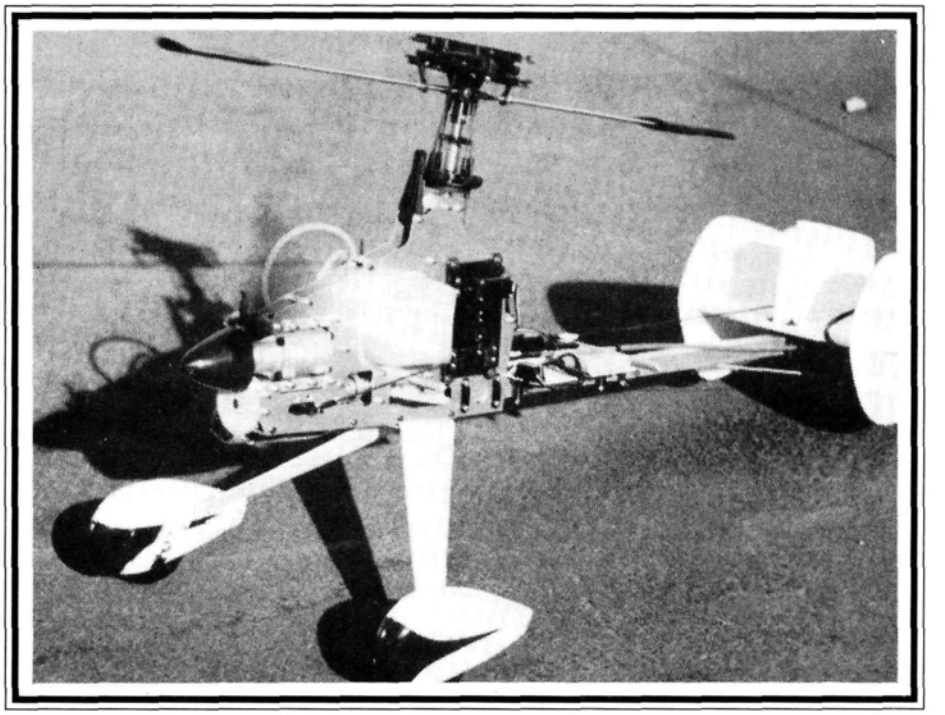


is almost covered by the front of the fuselage, so to make filling easier, I added a third line. To prevent the tank from being cut in half, you must install protective strips in the fuselage frames. Cut the strips 10 15/16 inches long for each side, then slide them into place. It might be helpful to use the tank to push the protective strips gently into the corners. A few drops of CA will hold the strips securely.

• Finishing the wheel pants and the undercarriage. Assemble the wheel pants as directed. When the plywood reinforcement is in place, add some 3/4-ounce fiberglass cloth to the inside of the wheel pant in the area of the reinforcement. To help keep the wheel pants in one piece (especially if you fly off grass), bond the fiberglass into position with thin CA. Also, first drill the front hole on each wheel pant and then use the landing gear to position the second hole. (The hole position shown on the plastic part is wrong.) When you tighten the wheels on the landing gear, make sure that both wheels spin freely. If one is tight, you'll find it difficult to handle the Whopper when it's on the ground.

• Covering the rotor blades. The Whopper blades have the most unusual profile I've seen on a rotorcraft; it's somewhat undercambered, like a glider wing. The large, impressive blades require only light sanding before you cover them as directed. Be very careful when you remove the blade film from its backing. If you carelessly tug it free, you'll wrinkle it, and wrinkles in

(Continued on page 98)

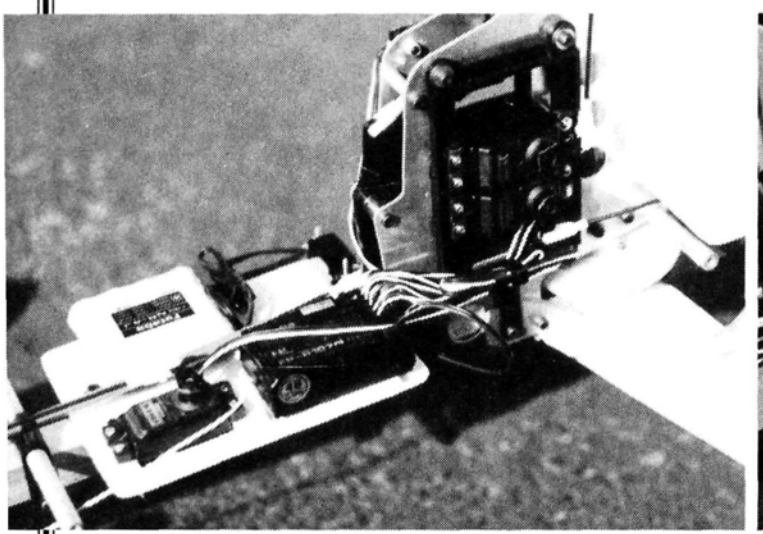


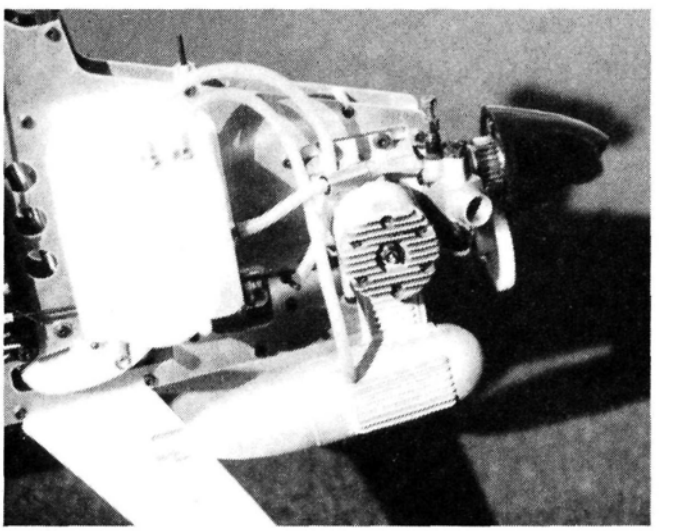
Testing motor and pre-rotation unit. The Whopper is well-engineered and should last a long time.

Bottom (left to right): ■ *The lever on the bottom left of the frame engages the two-cone clutch for pre-rotation. The servos on this side control fore-aft cyclic (elevator) and clutch.*
■ *The servos in the side frame are left/right cyclic and throttle; the rudder servo is at the rear. The servos in the frame are shock-mounted on grommets.*
■ *Note the nylon drive gear and the gear on the motor shaft, which are part of the pre-takeoff rotation unit.*

HELICOPTER VS. AUTO GYRO

This shows the difference in airflow between an autogyro and a helicopter. Notice that the air coming from below spins the autogyro's blades.





Whopper

(Continued from page 97)

film are a bear to get out! I checked my blades on a triple-beam balance and put a red stripe on the lighter one to equalize their weights. I doubled-checked their balance by mounting the blades and hanging the head upside-down.

• **Installing the radio.** I use a Futaba* 7GH radio with five S9201 servos. Check that your servos fit the molded plastic servo mounts; if they don't, you can easily add plywood strips to fit your servos. Ensure that the swashplate and flybar are at neutral. For cyclic and rudder controls, I use long servo arms with the clevis all the way out. For the clutch assembly, use a wheel output, and set it up so the cones meet when the clevis is at the 12-o'clock position when viewed from the left side.

• **Rudder and rotor adjustments.** The rudders should have a 5/8-inch offset to the left. This measurement is from the fin center line to the rudder center line (viewed from above). The rotor blade should have minus 1 degree of pitch, which is achieved by adjusting the pushrod that goes from the swashplate to the mixer arm on the head. Adjust these so that both are 4 1/4 inches between the ball-link centers to start, then check them with a pitch gauge.

PREFLIGHT CHECKS

Before you attempt that first takeoff, check the Whopper's center of gravity. Mine balanced perfectly without ballast. Check again that the blades have minus 1 degree of pitch. The swashplate should have maximum throw and should be set at 0 degrees in relation to the main shaft. For a smooth takeoff, the rudders must have left trim, so use my measurement to start, and then adjust yours as required.

Make sure that your motor operates reliably. When the Whopper is mechanically ready to fly, read the flying instructions until you understand what's going to happen.

PERFORMANCE

If possible, make your first flights off a grass field. Check all the controls one last time, and if all is ready, start your motor and adjust it to ensure a smooth transition from idle to full power.

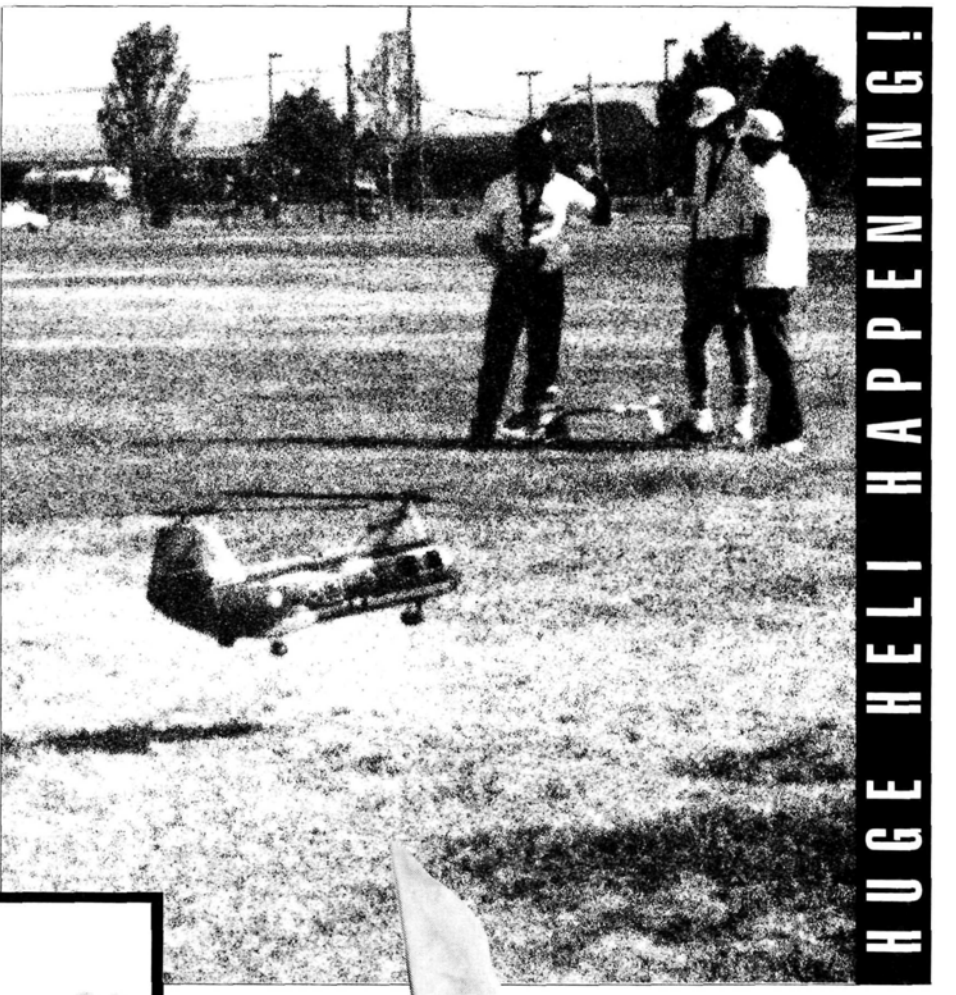
Continued on page 125

HUGE HELI HAPPENING!

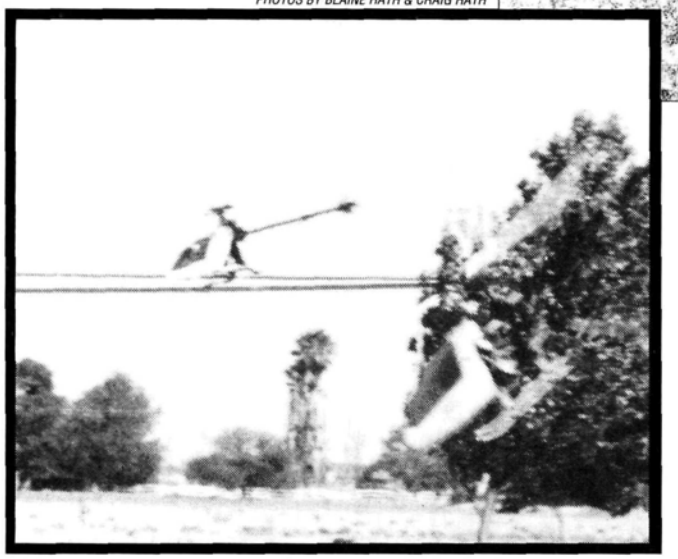
BY CRAIG HATH

THE WEST COAST R/C Helicopter Fly-In was the first event of its kind to take place west of the Rockies. Held at Merced College in Merced, CA, and sponsored by the Merced County R/C Club, this year's two-day event was the largest ever—it attracted 124 entrants! The parking lot was packed, and pilots, ground crews and spectators swelled the ranks to well over 1,000. Owner of the Hobby Castle, Merced's Chuck Winter was a major reason for the Fly-In's success. Chuck has run the event for the last eight years, and he has done a great job.

The flying field was next to the school's football stadium. I've attended this event before, and this year it was obvious that we needed more space. With 124 entrants, and as many as 12 machines in the air at one time, things can get a little tight for the pilots.



PHOTOS BY BLAINE HATH & CRAIG HATH



8th ANNUAL MERCED R/C HELICOPTER FLY-IN

Club members took care of frequency control, and those wishing to fly had their pilot's frequency pin posted on the stand that was designated for that particular channel. Each time a pilot returned a pin, it went to the next pilot in line. This system works well, and it should be used at other busy flying fields to ensure that everyone gets a turn. Another great feature of frequency control is that your time is monitored when you have the pin; if you're out for too long, you're given the "hog" frequency pin, and you might even lose your turn to fly!

The Fun-Fly consisted of several events:

- Heli Pad Landing: Novice and Open Classes. Fliers had to spot-land on a course of helipads.
- Ring Pickup: a timed event for Open fliers. Over a six-ring course, pilots had to pick up a little ring with their landing gear skids, drop it off and pick up the next one until six had been delivered.
- Limbo contest: Open pilots had to fly under two crepe ribbons that were continually lowered. Anyone touching or breaking one of the ribbons was eliminated!

• Autorotation event: pilots climbed to altitude, executed the autorotation and attempted to hit the center of a 3-foot-wide landing pad three or more times—a very popular event.
• Fun Scale: a non-flying event with 21 entrants—more than the AMA Nationals had! Helicopters were judged on how well they resembled their full-size counterparts.
• Drag Racing: a new event with two helipads at one end of the field and a finish line a few hundred yards away. Flag man Chuck Winter bravely stood between the two pilots and signaled the starts. I saw both hovering starts and starts from helipads, so I assume there was a slight change in the game plan between Saturday and Sunday. The first to the finish line won. This was heads-up racing with no handicaps!

NIGHT FLIGHT

The flying didn't stop when the sun went down. I had my new Kalt Whisper electric with me, and since electrics are hot new items, it received a lot of attention. On Saturday night, we stopped to talk with a group from Seattle. They must have been waiting for us, since they had moved the motel furniture out of the way! They wanted to fly the Whisper in their room! I'm not one to miss out on a challenge, so I quick-charged my Whisper's batteries. The flying was going well until Greg Molaskavich bounced the Whisper off the ceiling. Then, practically everyone in the room had the same idea (a poor idea, actually!): why not land the Whisper upside-down on the ceiling? The machine spit a rotor blade off while Frank Dykes was holding it inverted (for flight-trimming). This was caused by the failure of the rotorhead hub plate (probably owing to some severe tracking problems that have since been solved.) How about next year, guys?

Some of the country's hottest pilots showed off their newest helicopters this year. Beginning and advanced fliers pushed themselves to the limit as they competed for over $3,000-worth of prizes and took a chance on over $4,000-worth of raffle prizes. Even with all this activity, there was still time to shoot the breeze. This was supposed to be a Fun-Fly, and that's what it was—*fun!* ■

Left and below: Rich Josephson's H-500E has great scale detail, and he's not afraid to fly it.

Left: This Apache AH-64 was made for the movies, so it has to fly well.

Below: Kevin Babineau's A-109 Medstart flown by Robert Gorham.

Left to right: Nice Westland Sea King (owner unknown). ■ Tim Wise's 4th-place winner: the CH53-A Chinook.

Above: Kevin Babineau works on the Medstar.

Right: Mean-looking new Vario Skyfox. Its glass rotor blades had an unusual tip design.

Merced 8th Annual Fly-In Winners

NOVICE HELIPAD LANDING
1. Brent Bookout
2. Vincent Grooler
3. Jeff Bernard
4. Charlie Rice
5. Tor Underwood

OPEN HELIPAD LANDING
1. David Lichodriejewski
2. Allan Yamauchi
3. Mark Ewert
4. Mark Holbrook
5. Dennis King

OPEN RING PICK-UP
1. David Lichodriejewski
2. Walt Ferar
3. Joe Escudero
4. Gilbert Ruiz
5. Joerg Groessler

NOVICE LIMBO
1. Brent Bookout
2. Mark Robb
3. Charlie Rice
4. Sam Delatorre
5. Frank Taylor & Tor Underwood (tie)

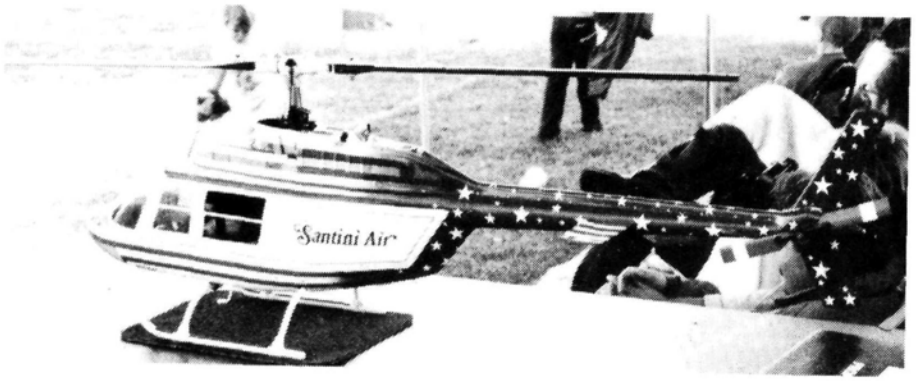
OPEN LIMBO
1. Walt Fera
2. Rich Josephson
3. Juan Rivera
4. Ron Bodwell
5. Mark Ewert

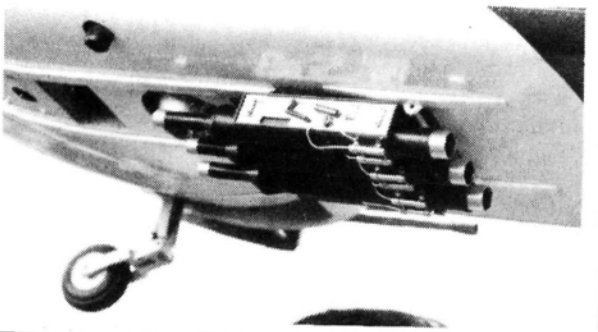
AUTOROTATION LANDING
1. Allan Yamauchi
2. Robert Gorham
3. Richard Armenteros
4. Dan Melnik
5. Martin Kuhns

FUN SCALE
1. Silas Kwok (Airwolf)
2. Kevin Babineau (UCLA Med Star)
3. Walt Ferar (Santini Air Jet Ranger)
4. Tom Wise (CH53-A Chinook)
5. Doug Wilson (Airwolf)

DRAG RACING
1. Gunter Rurath
2. Robert Gorham
3. Frank Dykes
4. Don Wade
5. David Bottita

Walt Ferar's Santini Air Jet Ranger won 3rd in Scale.





■ *Gorgeous Blackshark with Kalt Excalibur mechanics flies well and looks great.* ■ *Close-up of the gun detail on Silas Kwok's Airwolf. This machine won the Scale Championship at the 1990 AMA Nats.* ■ *Doug Wilson won 5th place in Fun Scale with this beautiful Bell 222.*

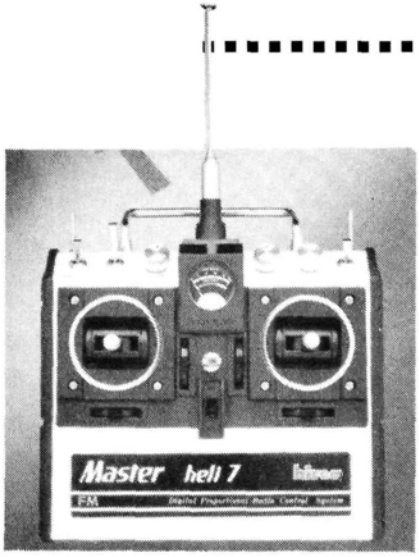
ROTARY-WING ROUNDUP

ALTECH MARKETING
Hirobo SST Eagle

Hirobo's use of both "traditional" metal parts and more modern engineering plastics makes each helicopter in its line incredibly rugged and responsive. The Hirobo SST Eagle .60 was designed for the discriminating modeler. Mr. Y. Dobashi used an SST Eagle with optional parts to win the '89 F3C World Championship. The rugged six-piece metal frame is very rigid. The Eagle has a metal SSR rotor head—a seesaw type that produces sharp pitch and roll response, yet remains stable with a built-in coning angle of 1 degree. The tail-rotor belt drive is efficient and quiet. Weighted blades and a no-play control mechanism deliver superb performance. Optional parts are available.

For more information, contact Altech Marketing, P.O. Box 391, Edison, NJ 08810.

HITEC R/C USA
Master Heli 7



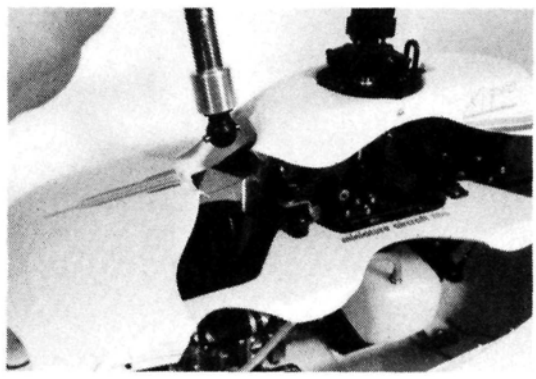
This 7-channel FM helicopter system incorporates the latest R/C electronic features, which surpass the 1991 AMA/FCC guidelines. Made by the world's largest manufacturer of R/C systems and accessories, the HITEC Heli 7 comes with the exclusive RCD "bulletproof" receiver. All seven transmitter channels are reversible, and the throttle/rudder and aileron/elevator control sticks can be adjusted for length and tension. The high-tech case is made of special RF shielding material. Its standard features—battery and RF meter, changeable RF module, five servos, whip-style receiver antenna and 100mAh battery—are usually associated with systems costing more. It comes with a one-year warranty.

For more information, contact HITEC R/C USA, Inc., 9419 Abraham Way, Santee, CA 92071.

MINIATURE AIRCRAFT USA
Torque-Tube Drive Kits

This new Drive Kit has high-speed ball bearings (with rubber isolation mount), Delrin, isolated, high-speed, universal joints at each end, and a graphite shaft. It improves tail-rotor response and eliminates any problems with alignment or vibration in pod-and-boom and fuselage applications.
Part no: 0807 (universal application).
Also available—versions for Schluter and X-Cell helis.
Prices: $74.95; Schluter and X-Cell, from $43.50 to $69.95.

For more information, contact Miniature Aircraft USA, 2324 N. Orange Blossom Trail, Orlando, FL 32804.



Helicopter Challenge

UNDERSTANDING TAIL-ROTOR TORQUE COMPENSATORS

by CRAIG HATH

VIRTUALLY EVERY radio-control system designed for use with helicopters has some sort of built-in tail-rotor torque compensation. These systems, which have names like "Anti-Torque" or "ATS," are basically electronic mixers that increase and decrease tail-rotor pitch in conjunction with the throttle. Some radios even allow you to decide how much to put in (when and at what rate), and this permits extremely precise compensation. Let's take a closer look at tail-rotor compensators and learn more about setting them up properly.

THE IDEA BEHIND IT ALL

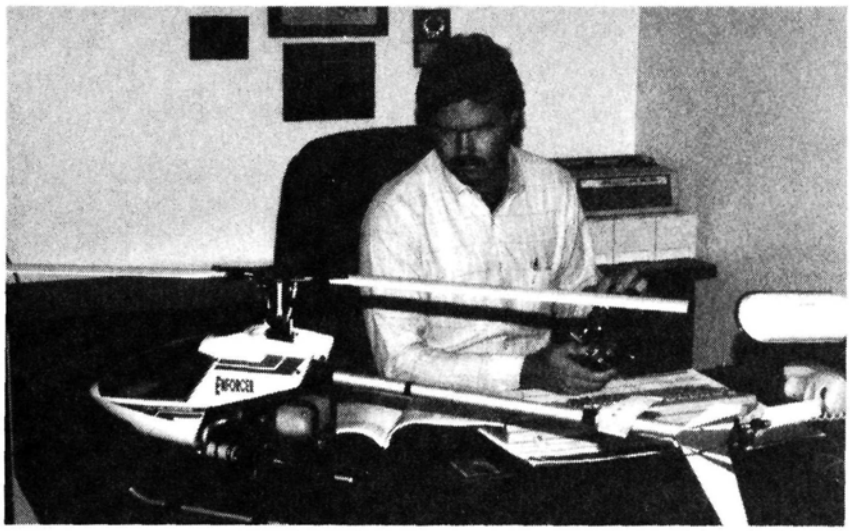
Radios include tail-rotor torque-compensation systems to help offset the ill effects of engine torque on our helicopters. Think about a model helicopter as it sits on the ground with the engine running at idle—rotor speed zero. As the throttle is opened and the clutch engages, the rotor disc starts to turn. From this point all the way up to full power, and from full power back to idle, a force known as "torque" attempts to twist the helicopter around.

Torque is the primary reason that tail-rotor systems are built into helicopters in the first place. If a heli with a single main rotor had no tail rotor, it would spin in a direction opposite to that of the main rotor disc.

Usually, we hover our model helicopters and adjust the mechanical pitch of the tail rotor so that it develops just enough thrust to hold the yaw axis in one spot. This works pretty well while hovering, but when we decide to move the helicopter around or land it, the amount of thrust required to control the yaw axis changes. Another problem is holding the tail steady until we can increase the rotor speed and lift the helicopter into a hover. What usually happens is that we use tail-rotor pitch to compensate for changes in torque in practically every flight attitude!

To get a feel for how this works, set your model on a smooth surface, e.g., a piece of plywood, and switch off the gyro and any tail-rotor compensator. Without touching the tail-rotor pitch control, throttle up from idle to just before liftoff. At this point, your helicopter will probably be spinning in circles!

After reading this article and setting up your tail-rotor compensation system, try this test again, and see if the tail rotor doesn't stay pretty much in one place. The tail-rotor pitch will automatically adjust to hold the tail steady during engine "run up" and "run down." Actually, this may be overstating things, as the compensation isn't very effective at very low rotor speeds and there are other factors (like wind) to consider.



To understand how the torque-compensation system on your radio works, sit down with the radio, its manual and the helicopter. Do some experiments on the bench first, and then set-up at the field.

The tail-rotor pitch is fixed to compensate for the engine torque at hover without any compensation. The amount of torque produced during the transition from sitting on the ground to liftoff varies—requiring less tail-rotor pitch initially and gradually more as power increases.

GETTING THE JOB DONE

Most tail-rotor torque-compensation mixers have three basic elements:

- *Up-pitch mix* controls the amount of tail-rotor pitch added over and above the fixed tail pitch from the hover point (half throttle/collective stick on most radios) to

TROUBLESHOOTING CHART
TAIL-ROTOR TORQUE COMPENSATION

(This chart assumes that the main rotor is rotating clockwise. Always make adjustments with the gyro turned OFF. T/C stands for throttle/collective stick.)

PROBLEM	SOLUTION
Nose goes left on climb-outs from half to full T/C stick	Increase up-mix pitch
Nose goes right on climb-outs from half to full T/C stick	Reduce up-mix pitch
During climb-out from half to full T/C stick, nose goes left, then straightens out	Increase acceleration mix
During climb-out from half to full T/C stick, nose goes right then straightens out	Reduce acceleration mix
Nose goes left from half to low T/C stick	Reduce down-mix pitch
Nose goes right from half to low T/C stick	Increase down-mix pitch
Condition worsens when above directions are followed exactly	Reverse direction of mixing

The JR PCM 10 allows very flexible control of torque compensation, including full setup for hovering, stunts and autorotations.

full throttle.

• *Down-pitch mix* controls the amount of tail-rotor pitch subtracted from the fixed tail-rotor pitch from the hover point to the low throttle setting.

• *Acceleration mixing* is used to give extra tail-rotor pitch momentarily in either direction to counter sudden throttle-stick movements or to compensate for highly responsive engines that produce a strong "spike" of torque that then tapers off.

Some radio systems allow you to fine-tune the hover point (i.e., the point that differentiates between the up and down mix); others permit adjustment of the tail-rotor pitch to offset the effects of a sudden transition into autorotation.

IN-FLIGHT ADJUSTMENTS

No matter what your skill level, you can benefit from using a well-adjusted tail-rotor torque-compensation system. Don't confuse tail-rotor pitch mixers with gyro sensors; although they perform similar tasks, they're designed to work together. A gyro senses yaw-axis motion and sends a signal to the tail-rotor pitch-control servo to direct the yaw in the opposite direction. A good gyro eliminates most of the need for minor tail-rotor corrections, and a gyro operating in conjunction with a well-adjusted torque-compensation mixer provides almost perfect tail-rotor control.

I've found that the best results are achieved by setting up the mix in this order:

- Set the upmix
- Set the acceleration mix (if you have one)
- Reset the upmix
- Set the downmix

The reason for this sequence is that if you decide to use the acceleration mixer, it seems to affect the

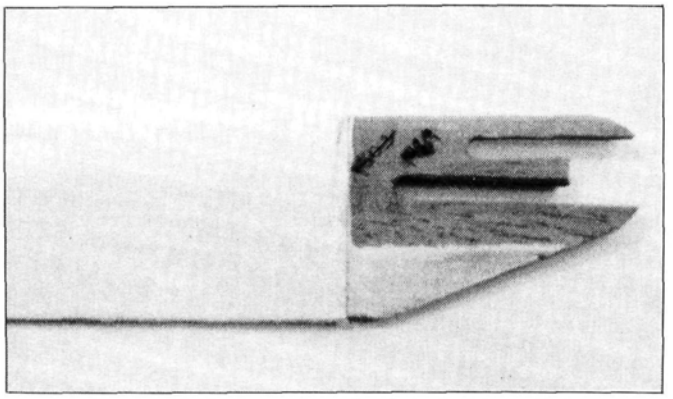
(Continued on page 107)

HELI CHALLENGE

(Continued from page 105)

amount of pitch needed for both the up- and the down-mixes. Once you've arrived at a balance between the up-mix and the acceleration mix, it's easy to set the down-mix.

When making adjustments, especially of the acceleration mixer, try to maintain the same rate of throttle/collective-pitch application. If you jump into the sky on one attempt and soar gently upward on the next, the results will be inaccurate. I usually make ascents at what I call an "average" climb-out—by increasing the throttle/collective smoothly, not slamming it open. Be sure your climb-outs end up at full power so that you can look at the full flight envelope. The same goes for your descents: be sure to close the throttle/collective stick fully to check your heli's reactions under extreme conditions.



One of the rotor blades from the author's X-Cell .60, which came off at the bottom of a square loop! Inspection of the blade-grip area revealed very little adhesive on one side. Because rotor blades are subjected to a lot of stress, we must pay attention to details when building them.

All of this applies to adjusting the torque-compensation mixer for use in the *normal flight mode only*. If you use idle-up for aerobatics or switchless inverted flight, your needs will be different. The mixer will have to *reduce* tail-rotor pitch from the hover point down to zero degrees of main-rotor pitch, and then *add* tail-rotor pitch from zero through whatever amount of negative main-rotor pitch you use. As far as I know, the JR* PCM-10 is the only radio system that's capable of this type of mixing.

Some radios (like the Futaba* 1 024 9-channel and the JR X-347) will automatically switch off the torque compensator when either the idle-up or flight-mode switch is moved from its normal position. The X-347 allows for an independent torque-compensation mix of flight modes 1 and 2 combined. If your radio system won't allow for such situations, you'll have to compromise on the down- mix and probably leave it set at zero.

TROUBLESHOOTING

The chart provided gives basic instructions for adjusting almost any torque-compensation system. You'll have to re-adjust your system from time to time, so you should have the information handy. Why not cut out the chart and keep it in your flight log, or whatever system you use to keep track of your machine?

I strongly encourage any flier to take advantage of the goodies radio manufacturers provide. Forget about the argument that using these devices covers up for a lack of skill. The truth is that the better you set up your equipment and use the systems you have, the more you can concentrate on the pure elements of flight.

Here's a perfect example: former world champion Curtis Youngblood was flying a JR PCM-10 that he and his father, Dave, had modified into a single-stick unit. I asked Curtis if he liked the radio, and he said it was great, but he would have liked more free mixers so he could eliminate a few more bugs. (In addition to all of its pre-programmed features, the PCM-10 has five free mixers.) I agree with his thinking: when you're not busy trying to correct adverse trim conditions in flight, you'll be more aware of any problem or emergency that creeps up.

Next month, we'll check out some of the other neat features that are built into our radios. Keep practicing!

**Here are the addresses of the companies mentioned in this article:*
JR Propo Radios; *distributed by Hobby Dynamics, P.O. Box 3726, Champaign, IL 61826.*
Futaba Corp. of America, *4 Studebaker, Irvine, CA 92718* ■

SIMPROP RACER

(Continued from page 65)

moderate heat, and it can be applied from the center out toward the edges without wrinkling or trapping air bubbles. I prepared the fuselage by scraping the seam with a razor blade and then sanding it with 600-grit sandpaper. (I needed no filler or primer.) For trim, I admit that I was influenced by the color scheme I saw on a car in a parking lot, and I was lucky to find that the TRC* stripe and "wave" vinyl transfers for R/C cars were of a suitable size for this airplane.

PERFORMANCE

With its sleek configuration and moderately high wing loading, the model takes a pretty good heave to get it going, but the powerful motor starts pulling right away. After a typical hand-launch, it drops slightly and then climbs briskly at an angle of up to 45 degrees. In half a minute, the High Speed could become just a speck in the sky.

It has a relatively fast roll rate (but didn't place in this event at the KRC meet). It's best to do loops rather large and open, or the airplane will lose too much speed and could snap out of a very tight loop. Straight flight is rock-solid, and inverted flight requires just a touch of down-elevator.

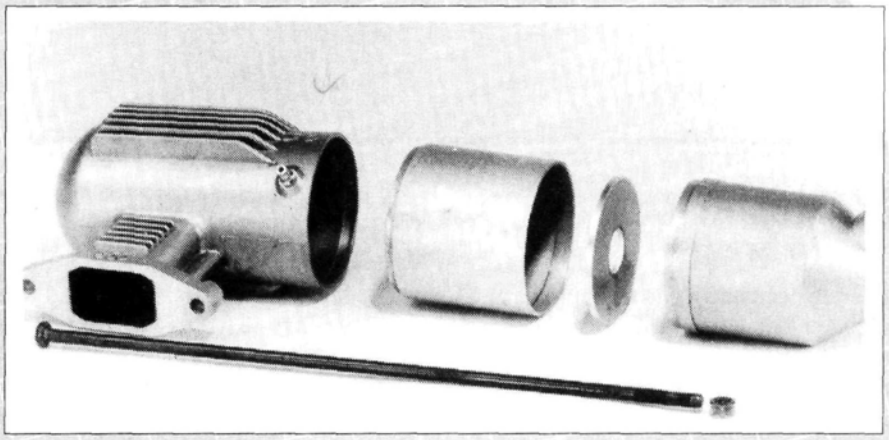
When the power runs out, the High Speed has to be maneuvered quickly to a fast, straight-in approach. As long as its nose is kept down, it will travel a long way, especially in ground effect, but it would be a mistake to bleed-off the air speed before it reaches the field. Although its stall is quite gentle, it needs the speed to keep flying; otherwise, it has a high sink rate.

(Continued on page 116)

ENGINE EVALUATION

O.S. MAX BGX-1

by MIKE BILLINTON

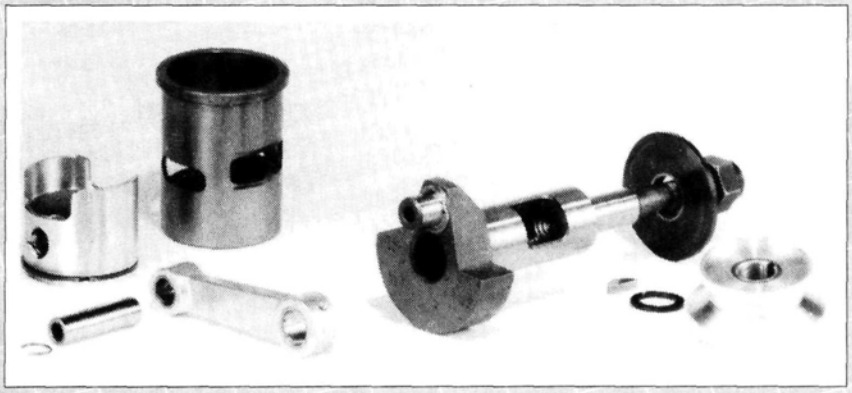


The two castings and the disc on the left form the first silencing chamber, while the tail casting on the right is the second chamber. This design suppresses sound very well.

THE WORLD'S leading producer of model engines—O.S.—has now introduced its largest-capacity, single-cylinder engine: the MAX BGX-1.

Concerned about the noise of large engines and the loss of flying sites it causes, O.S. spent a long time on the development of this fine 35cc engine. (The company's previous multi-cylinder engines are much more complicated and expensive, so they aren't as competitive as the typical converted chain-saw engines.)

Despite their noise, demand for large, simple engines remains strong, and O.S. has tried to ensure that the BGX-1's design allows a fairly lazy, low-rpm operation with moderate noise levels. O.S. also provides a really effective standard muffler to reduce this engine's noise output still further—in fact, to unusually low dB levels. With its modest dB readings and its low-frequency operation, the BGX-1 should be less irritating, and this should help to safeguard flying sites. (The noise level that constitutes a "nuisance" is very subjective: for some, a WW II Lancaster bomber's 4x27-liter, 108,000cc, 12-cylinder Merlins "open-exhausting" at 3,000rpm are less irritating than a typical 10cc 2-stroke doing its 12,000rpm!)



The crankweb is a beefy 15mm thick; the resulting "over-balance" provides very smooth running.

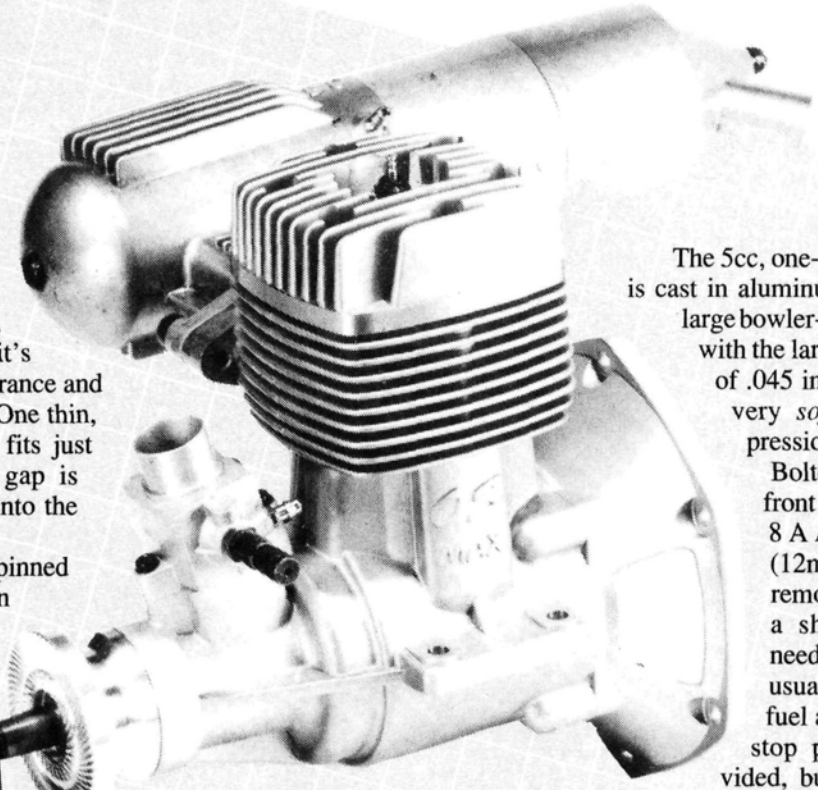
MECHANICAL DETAILS

O.S. was obviously determined to make a product that would be hard to resist! The simple, stocky, rigid, 18 1/2-ounce, one-piece crankcase/front housing is superbly pressure-die-cast in aluminum alloy (a design that owes much to lessons learned with the much smaller 3.5cc engines used in 1/8-scale cars). Maybe the provision of an adjustable spark ignition would be a final "coup de grace" for this converted chain-saw engine.

A massive crankshaft (almost 10 ounces of hardened steel) continues the theme of high rigidity, the web itself being 15mm thick. Induction timing is a restrained 172 degrees, and the early closing point of 42 degrees ATDC ensures good low-speed performance. Torque transmission is by means of a Woodruff key in a shaft that drives the substantial aluminum propeller driver.

The connecting rod is of strong aluminum alloy (the shank is 6mm thick and 14mm wide), and each end has the plain phospor-bronze bushings usually used in smaller 2-strokes (unlike the usual provision in industrial engines—rolling

This single-cylinder 35cc powerhouse takes up the converted chain- saw engine challenge.



The finely constructed O.S. 35cc single is a powerful, practical performer.

element bearings).

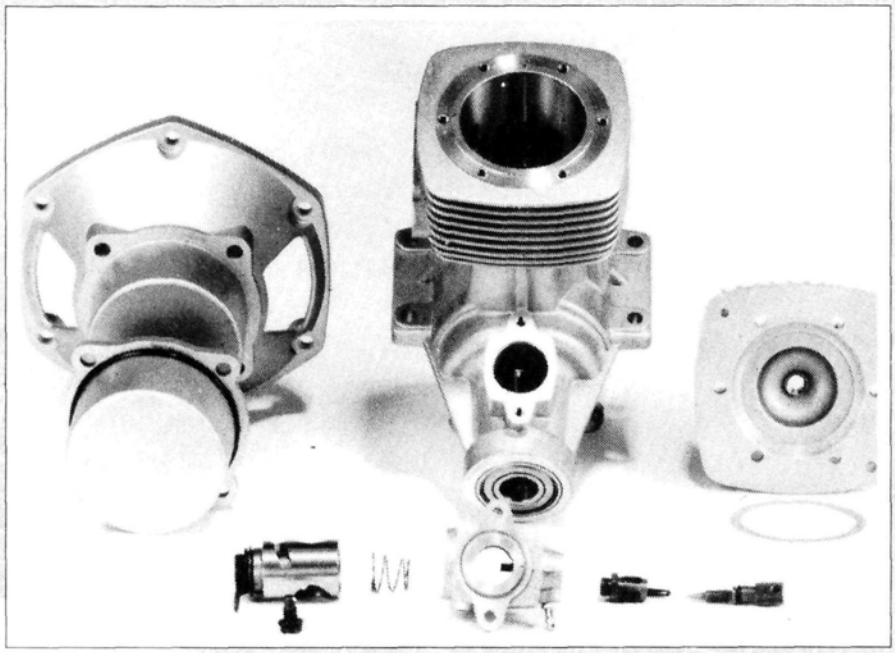
The piston is turned from a low-expansion, heavy-duty, aluminum-alloy casting, and it's fitted at a .004-inch skirt clearance and a .007-inch crown clearance.One thin, strong, cast-iron piston ring fits just below the crown, and the gap is "pegged" to stop it rotating into the cylinder port openings.

The hollow wristpin is pinned into position and runs freely in both the conrod little end and the piston bosses. The steel cylinder liner is completely plated (after being ground to size) by the favored, effective O.S. "Nikasil" method. Schnuerle porting with a mild 153-degree exhaust timing is used, and there's a sufficient overlap period of 19 degrees over transfer timing to allow a reasonable response from the available tuned pipe—available to the public, that is. I didn't use one for this test because it costs almost as much as the engine itself, but its *claimed* higher power at even lower sound levels would have been interesting to verify.

The 5cc, one-piece cylinder head is cast in aluminum alloy and has a large bowler-hat shape. Together with the large squish clearance of .045 inch, it gives a final, very *soft*, effective compression ratio of 6.16:1.

Bolted directly onto the front housing, the simple, 8AA, 11mm-bore (12mm if the sleeve is removed) carburetor has a short, rigid, main-needle adjuster and the usual secondary-needle fuel adjuster. A throttle-stop position isn't provided, but a radio-transmitter trim comtrol fills this role.

Finally, there's an immaculate radial mount, which is provided as an alternative to the built-in beam-mounting lugs. My dynamometer readings were taken using the beam mounting, so I can't comment on the radial mount. (It does, however, *look* the part, and it should take most of the stress to which the engine will subject it.) The single-cylinder model engine is usually more of a problem when it's hanging over the end of a radial mount and subjected to high power and rpm combined; but I speculate that with normal muffler use and rpm below, say, 8,000, you'll have no problems using this mount.



The castings meet O.S.'s consistently high standards. The carburetor (in front) doesn't have an adjustable throttle stop; the idle and mid-range mixture goes through a secondary needle in the left side of the throttle barrel.

PERFORMANCE

The fine finish and accuracy of the BGX-1's parts meant that running-in was relatively brief. The recommended propeller sizes are around 20x6 and 18x12 (depending on craft size and type). I started with a light-load 20x6 Zinger, and it soon became clear that larger-load propellers were within the capabilities of this powerful engine. The *soft* design features mentioned earlier allowed a detonation-free 4,146rpm from the final (heaviest) loader—the 24x12 Punctilio Airflow beech propeller.

It also became clear that the usual attempts to hand-start wouldn't work. The compression seal was so effective, and the glow ignition worked so well, that the only effective method was lazy reverse-rotation of the propeller. The instant ignition kick then swiftly initiated normal rotation.

Test 1. Open exhaust. Fuel: 5 percent nitro/10 percent castor/5 percent ML70 synthetic oil/80 percent methanol. O.S. no. 8 glow

O.S. MAX BGX-1

SPECIFICATIONS

DIMENSIONS & WEIGHTS

Capacity	2.1326 cubic inches (34.947cc)
Bore	1.468 inches (37.3mm)
Stroke	1.260 inches (32mm)
Stroke/bore ratio	0.858:1
Timing periods	Exhaust - 153°
	Transfer - 115°
	Boost - 106°
	Front Induction: Opens - 50° ABDC
	Closes - 42° ATDC
	Total period - 172°
	Blow-down - 19°
Combustion volume	4.7cc
Compression ratios	Geometric - 8.43:1
	Effective - 6.16:1
Exhaust-port height	0.385 inch (9.8mm)
Cylinder-head squish	0.045 inch (1.14mm)
Cylinder-head squish angle	10°
Squish-band width	0.2 inch (5.1mm)
Carburetor bore	0.433 inch (10mm)
Crankshaft diameter	0.866 inch (22mm)
Crankshaft bore	0.598 inch (15.2mm)
Crankpin diameter	0.432 inch (10.99mm)
Crankshaft nose thread	0.371x24 TPI (3/8 ONF)
Wristpin diameter	0.353 inch (9mm)
Connecting-rod centers	2.32 inches (59mm)
Engine height	5.5 inches (a139.7mm)
Width	3.34 inches (84.8mm)
Length	Bare - 5.25 inches (133.3mm)
	w/radial mount - 6.19 inches (157mm)
Width between bearers	2.44 inches (62mm)
Beam mounting-hole dimensions	1.259x2.913x0.2 inches (32x74x5mm)
Radial mounting-hole dimensions	a 100mm-diameter circle with 6, 5mm holes spaced 50mm apart

Performance:
Max. BHP .....

Max. torque .....

RPM on standard propellers:

16x6 Merati .....
18x8 Top Flite .....
20x6 Zinger .....
20x10 Top Flite .....
22x8 Mastro .....
20x10 Mastro .....
24x8 Zinger .....
24x8 Airflow .....
24x10 Airflow .....
24x12 Airflow .....

Performance Equivalents:
BHP/cu. in. .....
BHP/cc .....
Ounce inch/cu. in. .....
Ounce inch/cc .....
Ounce inch/pound .....
Gram meter/cc .....
BHP/pound .....
BHP/kilo .....
BHP/sq. inch frontal area .....

Exhaust-manifold bolt spacing
Frontal area .....
Weight .....

plug.

O.S. makes no recommendation as to oil percentages, but it advises the use of a "good commercial fuel" based either on castor oil or synthetic oil. The low rpm achieved with the 24x12 propeller encouraged me to do further tests during both this open-exhaust torque test and the standard muffler test.

Maximum torque appeared at 5,711rpm, and maximum bhp occurred right on 10,000rpm, and at 4.06hp, it was very close to the O.S.-specified 4.1hp at 10,000rpm. Unfortunately, O.S. gives no indication of engine configuration: tuned pipe, open exhaust, or silencer? It's probably safe to assume they mean open exhaust.

Rapid torque loss past 10,500rpm brought this test to a close, with this O.S. BGX-1, like other large-capacity singles, showing signs of running out of steam at these rpm.

Test 2. Standard muffler. Fuel and plug as in Test 1.

Even lower rpm were reached during this torque test, and at 2,650rpm, the engine was still churning out 320 ounce/inches (2 1/4 Newtons) with no signs of distress. I'm not sure what practical use could be made of this area of performance, or which load propeller would be required to achieve it—but, like

Continued on page 131)

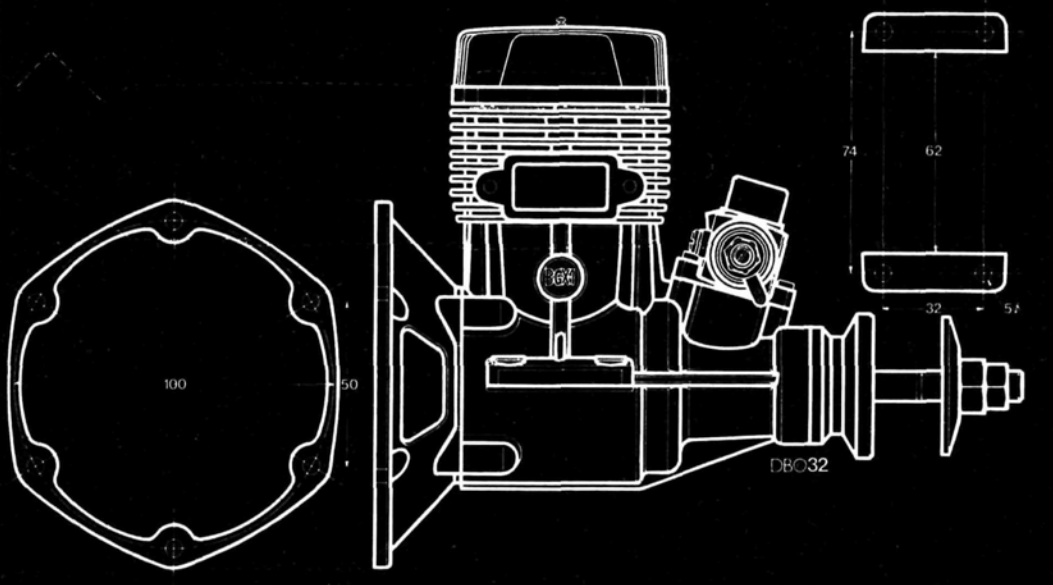
SOUND LEVELS—dB

Engine: O.S. BGX-1 2-stroke (35cc)
Equipment: open exhaust and O.S. standard muffler
Fuel: 5 percent nitro/15 percent oil
Engine position: 3 feet above the ground
Temperature: 71° F
Humidity: 76 percent
Propeller: 20x6 Zinger
Mean rpm: 8,300 (open exhaust); 7,800 (muffler).
Sound meter: Radio Shack's model 33-2050 set at 38 inches above the ground and pointing toward the nearest sound, i.e., propeller, muffler, or open exhaust. Three distances were used: 3 feet, 9 feet and approximately 22 feet.
Meter settings: "A" Scale and "Slow" response.

.....4.06 @ 10,000rpm (Open exhaust)
2.54 @ 9,093rpm (Standard muffler)
.....453 oz/in. @ 5,711rpm (Open exhaust)
365 oz./in. @ 5,200rpm (Standard muffler)

Crankshaft weight ..... 9.7 ounces (276 gm.)
Piston weight.....1.1 ounces (32 gm.)
Connecting-rod weight.....0.8 ounce (23 gm.)

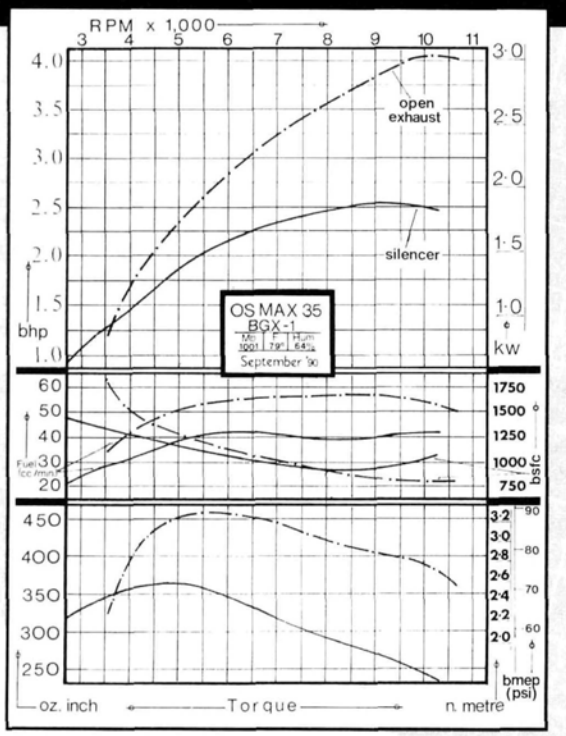
Open exhaust	Standard silencer
.....10,660	9,540
.....8,900	7,920
.....8,805	7,920
.....7,100	6,240
.....6,310	5,560
.....6,160	5,626
.....6,011	5,415
.....4,930	4,677
.....4,417	
.....4,146	

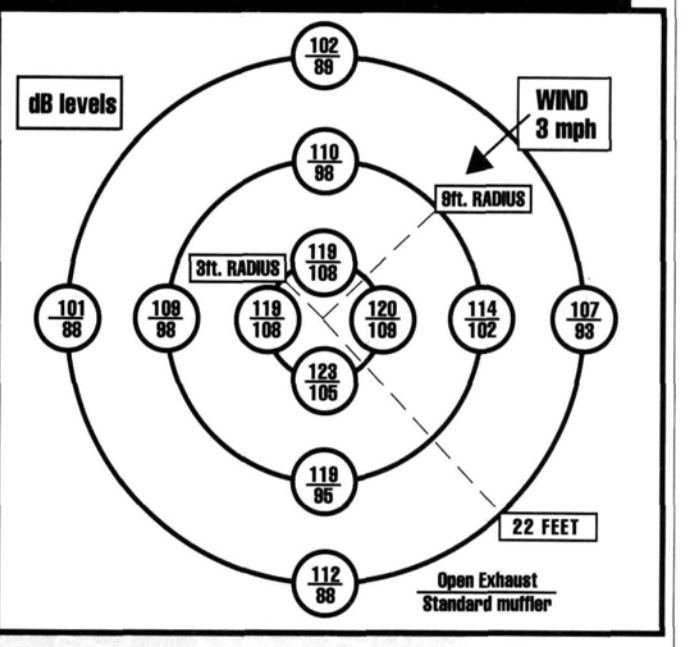


.....1.90
.....0.116
.....212
.....12.96
.....155.9
.....9.15
.....1.39
.....3.076
.....0.305

.....1.732 inches (44mm) & 2.362 inches (60mm)
.....13.3 square inches
.....Bare - 46.5 ounces (1.32 kilo)
w/muffler - 57.5 ounces (1.63 kilo)
w/muffler & radial mount - 60.05 ounces (1.7 kilo)

Manufacturer: O.S. Engines, Osaka, Japan.
U.S. Distributor: Great Planes Model Distributors, 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61820.

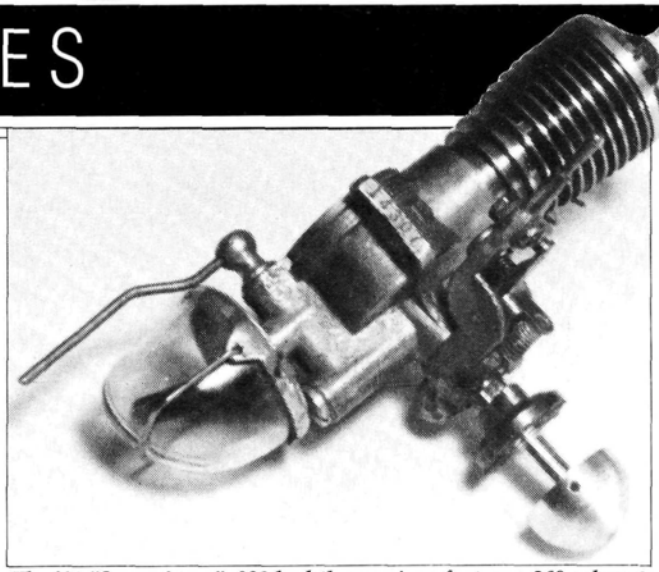




ABOUT THOSE ENGINES

by JOE WAGNER

Timely throttle and moving manufacturers



The '41 "Super Atom" .098 had three unique features: 360 exhaust ports, bypass in its piston, and no needle valve—just an air throttle, adjusted via the wire arm at the rear.

A MAJOR DIMENSION of radio-controlled flight is the ability to vary engine speed. Though R/C without throttle control isn't uncommon (most 1/2A R/C airplanes lack throttles), practically all of today's model motors come with carburetors. Nowadays, throttles are taken so much for granted that few hobby shops even carry control-line-type engines with plain venturi intakes.

You might think that model-engine throttles are a fairly recent development, but they've been around for over half a century. The '36 Forster "Little Hercules" (forerunner of the famous "99") was the first with a throttle. The Atom .098—another notable prewar motor—used a throttle for speed control, and it didn't even have a needle valve!

Of all the early model engines with throttles, the most elaborate was the '41 Kopper King. Its barrel-type carburetor, which resembled one from today's R/C motors, also controlled the spark timer. Moving the Kopper King's throttle arm advanced or retarded its ignition-point assembly through an ingenious pushrod gear linkage.

None of these early throttles was meant to be used in flight. For remote-controlled speed, we had to wait for Jim Walker, the

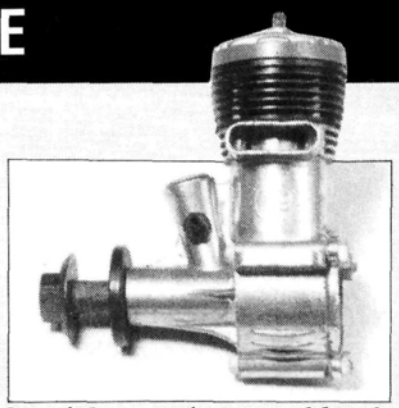
The '55 Jim Walker "Firecracker" .065 was the first glow motor that could be throttled in flight. Note rubber bellows at rear of engine and the bulb and plastic tubing that worked the throttle.

K&B ON THE MOVE

An era has ended; there are no more model engine manufacturers in Los Angeles! The list of miniature motors that were once made in L.A. reads like a history of model aviation: Baby Cyclone, Atwood, Fox, Bunch, Super Cyclone, Ohlsson, Dennymite, Bullet, McCoy, Orwick, Wasp, Veco, Phantom, Johnson, Spitfire, and, now, K&B.

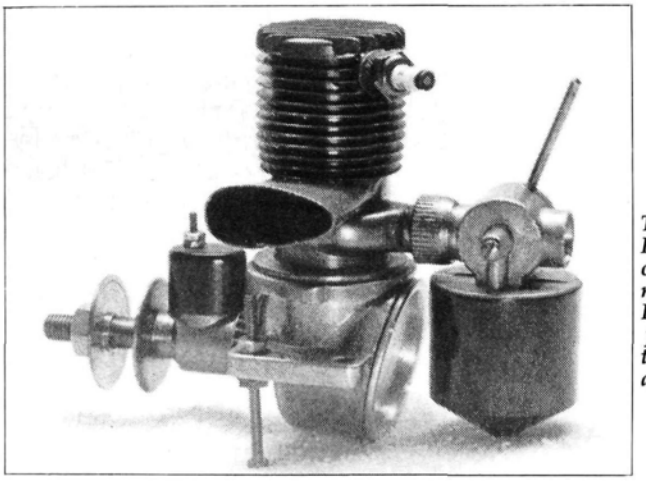
No, K&B has *not* gone out of business. It has moved to Lake Havasu City, AZ, and it's going strong with two shifts to keep up with the demand.

Why would the owners of K&B move their successful business of 44 years 300 miles to a desert city that didn't even exist when the company was founded? The answer is simple enough—Los Angeles is no longer a good place in which to make model engines.



One of the many famous model engines made at K&B's now deserted Los Angeles factory: the 1954 Greenhead Torpedo .29. A great runner!

On my final visit to the famous old K&B factory, John Brodbeck Sr. (the "B" of K&B) told me about the major problems he faced. The worst was the severe shortage of competent help. In the



The '41 Kopper King .60 was the only model ever manufactured in Pittsburgh. It featured coupled throttle and spark-advance controls.

renowned inventor of U-Control.

First, Jim came up with his two-speed control for spark-ignition engines. That was a double-point setup: switching from one to the other provided high and low engine speeds with a difference between them of perhaps 3,500 to 4,000rpm. Jim used this two-speed system so successfully in his early R/C airplanes that he won the R/C event at the AMA Nationals with it (three times, I believe).

For glow engines, Jim devised a clever variable-intake restricter coupled to an exhaust throttle, which he patented for use on a 1/2A control-line model. Air pressure produced by a bulb squeezed by the pilot actuated the throttle control by means of a long, thin, plastic tube. A tiny rubber bellows at the rear of the motor converted the air pressure changes into throttle motion. It sounds complex, and it was—but it worked! ■

heyday of model-airplane motor production, Southern California's immense aviation industry attracted precision machinists, skillful tool-and-die makers and ingenious assemblers. Model engine manufacturers drew freely from this talented pool.

Things are different now. Lockheed has closed its gigantic Burbank facilities, North American is out of business and Douglas is only a shadow of its former self. Now it's mighty hard for a model company to find employees who can tell a twist drill from a reamer, or who can feel the difference between a piston/cylinder assembly that fits properly and one that's too tight or too loose.

Another difficulty K&B faced in L.A. was impossibly strict air-quality requirements. K&B is a major glow-fuel supplier, and the pollution-control people focused on the volatile chemicals involved in that product line. On the hot day that I visited the old K&B factory, I couldn't smell any methanol or any other fuel ingredient in or around the glow-fuel production facilities. The process was automated and hermetically sealed, yet, John told me that they'd recently been fined for pollution-control violations, and that wasn't the first time.

Conditions are much better for K&B at Lake Havasu City. Costs are lower, traffic is much less congested, and the nearby McCulloch Motors plant has brought many skilled metal-workers to the area. Let's hope that K&B thrives there even longer than it did in its original hometown!

CONTRIBUTORS WANTED

We think many of our readers have ideas that are worth sharing. How many times have you read an article and said, "I could do that!" or "That's not the only way to do that; my way is easier!" Could be!

Here's your chance. We're expanding ***Model Airplane News*** and are looking for additional contributors to help us accomplish this objective. Of key importance are good photographs; the writing we can help you with. Interested? It's much easier than you *might* think!

Let's hear from you. Send in your article ideas and a few sample photographs. We're looking forward to seeing them.

Tom Atwood
Model Airplane News
Air Age Publishing
251 Danbury Road
Wilton, CT 06897

SIMPROP RACER

(Continued from page 109)

With a 9x5 prop and a 12-cell pack, the Ultra 900 motor develops a far greater wattage than the specifications indicate. It turns the prop at 13,000rpm, which is about equivalent to the performance of a good .28 glow engine. The High Speed really comes alive with this kind of power, but the 40-amp current drain depletes a 1,000mAh battery in about 2 minutes. Judging from the timed run at the KRC event, its top speed is in excess of 90mph, which is really moving!

After a half-dozen flights, I replaced the Graupner motor switch with a Jomar SM-4 speed controller. Following a full-power climb-out, approximately two-thirds power was comfortable for cruising, and it extended the duration of the motor run.

The Simprop High Speed is a high-performance, high-quality kit. Accomplished pilots will find it easy to fly, but moving from a trainer to a High Speed would be too much of a jump for a novice to take in one step. I found it exciting to fly and saw that it makes everyone—including gas-powered modelers—take notice.

**Here are the addresses of the companies mentioned in this article:*
Simprop; *distributed by Hobby Lobby International, 5614 Franklin Pike Cr., Brentwood, TN 37027.*
Graupner; *distributed by Hobby Lobby.*
Hobbypoxy, *36 Pine St., Rockaway, NJ 07866.*
Bob Violett Models, *1373 Citrus Rd., Winter Spring, FL 32708.*
Futaba Corp of America, *4 Studebaker, Irvine, CA 92718.*
SR Batteries Inc., *P.O. Box 287, Bellport, NY 11713.*
Jomar Products, *2028 Knightsbridge Dr., Cincinnati, OH 45244.*
TRC *(Total Racing Connection), P.O. Box 1058, 2211 Charter St., Albemarle, NC 28002.*
Sermos R/C Snap Connectors, *Cedar Corners Station, Box 16787, Stamford, CT 06905.* ■

GIANT STEPS

(Continued from page 72)

building. Making any necessary changes during construction is easier than trying to make them afterward.

NEW PLANS

may have the world's largest collection of 1/5-scale and larger model airplane plans, and it just keeps growing! Recent visits by the mailman have added two more to my collection—one scale and one non-scale giant.

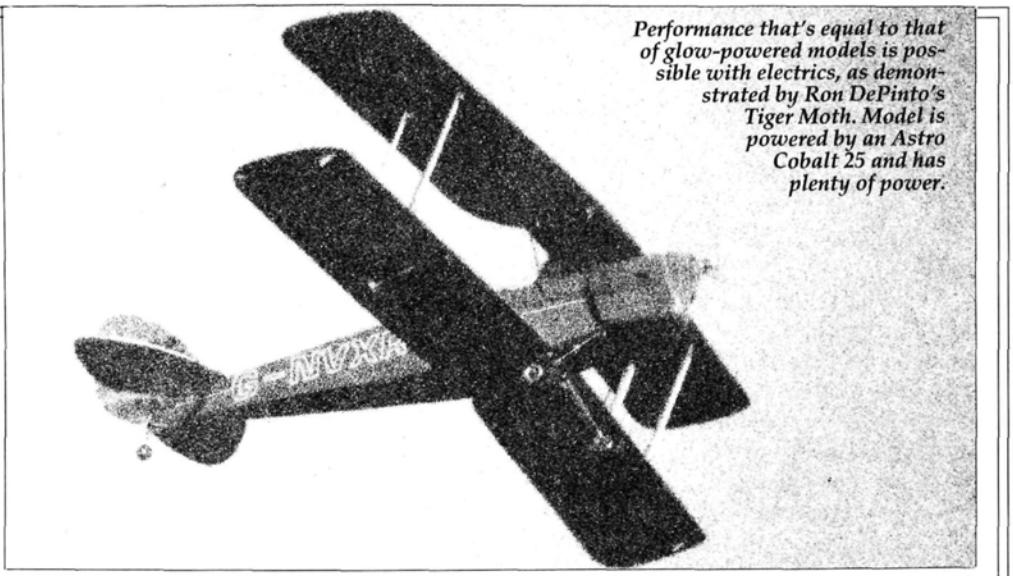
The Roadrunner is my new, non-scale model, and it's available as a plan or a kit from Fun Fly* in Lander, WY. This 90-

(Continued on page 121)

QUIET FLIGHT

Reverse ventilation; closed-loop linkage; electric vs. gas

by JOHN LUPPERGER



Performance that's equal to that of glow-powered models is possible with electrics, as demonstrated by Ron DePinto's Tiger Moth. Model is powered by an Astro Cobalt 25 and has plenty of power.

SOME OF THE best ideas and new products in our hobby come from innovative modelers. It's not that manufacturers don't come up with new concepts, but quite often, it's someone like you or me who sets the wheels of progress in motion. If you've had a new idea or found a way to modify something, why not share it with the readers of *MAN?* Who knows—a manufacturer may want to talk to you about making your idea available to everyone!

KAOS 40 ELECTRIC WITH SPINNER BLOWER

I recently received an interesting letter from Dwight Haney of Toledo, OH. He modified a spinner so that it would force air through his electric motor. Dwight used this spinner blower on his AstroFlight* Cobalt 40-powered Great Planes* Kaos 40. Converting a .40-size sport-pattern gas model to electric operation is quite an undertaking. I'll let Dwight tell you about it:

"I can't wait to tell everyone about my Kaos 40 electric conversion. The Kaos uses an AstroFlight Cobalt 40 motor on direct drive, and it has a 10x5 propeller and 18 Sanyo cells rated at 1700mAh. The batteries are mounted in the wing center section, the speed controller is Jomar's* SM-4, and the radio is a Cannon micro 4-channel. The speed controller is mounted on an .020 aluminum teardrop-shaped plate; then it's mounted in the canopy that's ducted with one hole in the front and a larger exit hole in the rear. One 6-cell battery pack is mounted in front of the wing spar, and the other two packs are behind the spar. The printers' plate aluminum that covers the batteries is removed for charging, and NASA scoops are used to direct cooling air.

Dwight Haney with his electrified Kaos 40.Model is powered by an Astro Cobalt 40, and it features a unique spinner cooling system for the motor.

"Super Kaos 40 electric modifications to the standard kit are easy to do. A 2-inch hole saw was used to lighten the tail surfaces: three holes were drilled in the rudder, two holes in the vertical fin and three holes in each side of the stabilizer. The kit's motor-mount rails were beveled to hold the motor, and the motor was clamped to the mount with a stainless-steel hose clamp. For the motor, a hole was drilled into the firewall, and then the motor/motor-mount/firewall was matched to the center line of the engine on the plan side view. The fuselage was built according to the plans, and just a few modifications were necessary to mount the motor and the firewall.

"I extended the wings 6 inches on each side, and this brought the wingspan to 64 inches and the wing area to almost 600 square inches. The nose gear will still steer well and stay sealed if you seal it with a

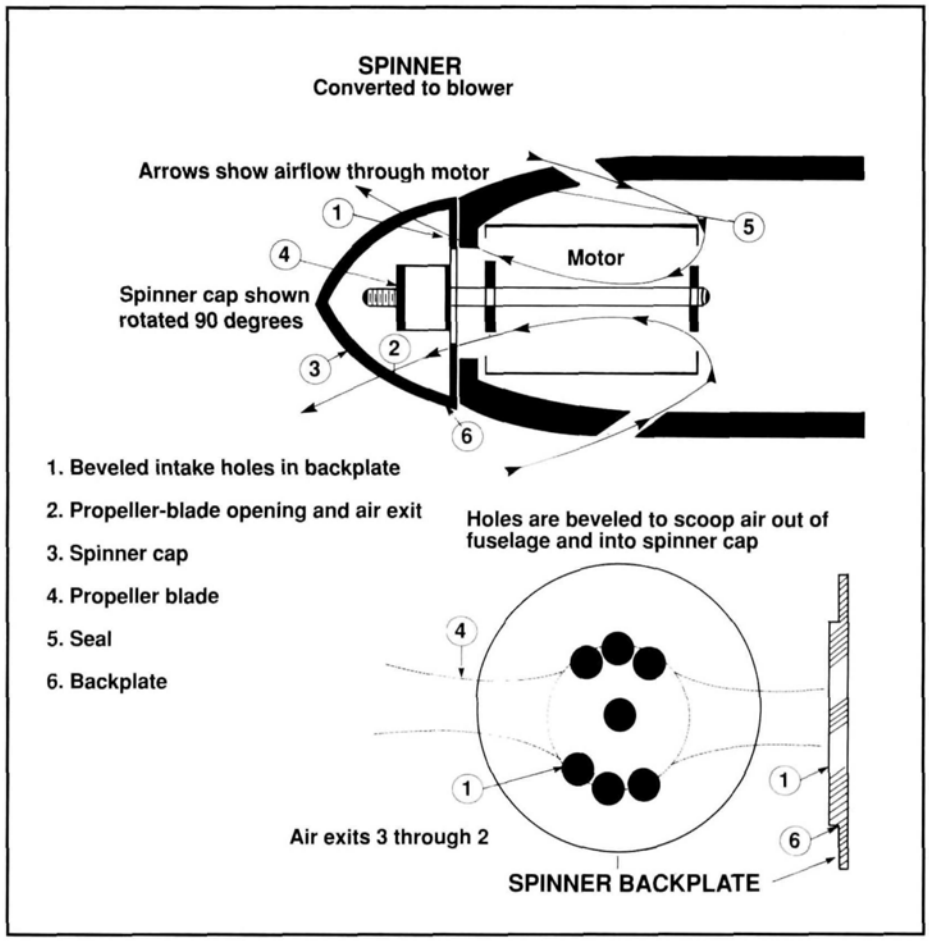
(Continued on page 120)

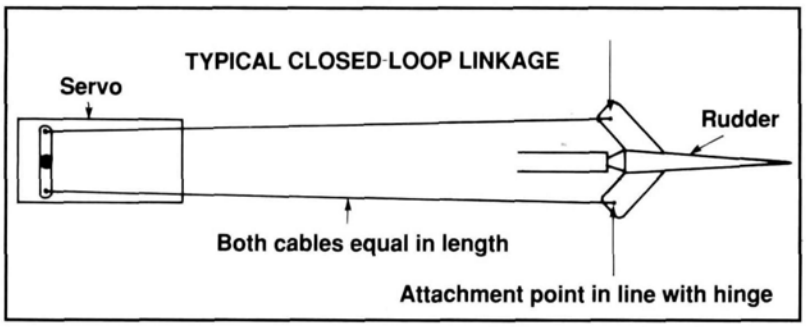
QUIET FLIGHT

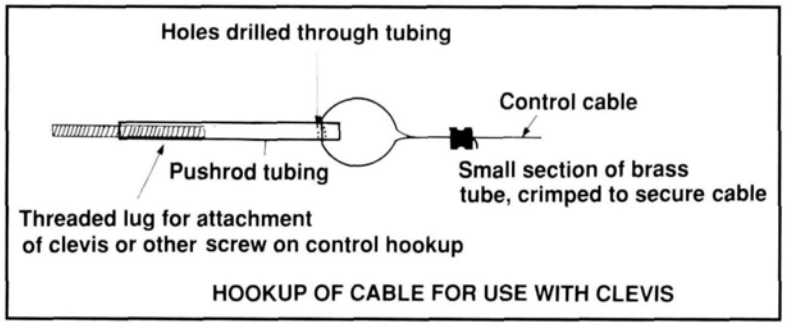
piece of surgical glove. Keep the fuselage sealed, except for the four, 5/16-inch holes that are drilled at each corner of the cowl just behind the spinner outside diameter. These holes let cooling air pass over the outside of the motor. The air is then pulled through the motor between the armature and the magnets by the spinner modifications (see illustrations).

"I can fly the whole sportsman pattern in 4 1/2 minutes at full power. I'd guess its level speed is about 50 or 60mph. When it cruises, it stays airborne for about 10 to 12 minutes."

The drawings show how Dwight's spinner works. It seems that, by keeping the fuselage sealed, the low-pressure area around the spinner (assisted by beveled holes in the spinner backplate) draws the air that enters the fuselage just behind the spinner back out through the motor. Rather than just having air pass through the fuselage, each electric component is cooled by its own ducting. The motor is cooled by air ducts and the spinner's "suction"; the speed controller is cooled by the heat sink and the canopy ducting; and the batteries are cooled by their position in the wings and by the NASA scoops. In this way, each part is cooled separately; heated air from the motor doesn't pass through the fuselage to join heated air from the speed controller, and then pass over the batteries. By keeping the components cool, the efficiency of the whole system should be increased.







Dwight's Kaos weighs only 6 pounds, 3 ounces and has a wing loading of just under 24 ounces to the square foot—quite respectable for a sport-pattern model. If you've done an interesting gas-to-electric conversion, please send some info and a couple of black-and-white photos to me (c/o *MAN*). I'm sure other readers would like to see what you've done.

CLOSED-LOOP LINKAGE

When I was in England last summer, I noticed that most modelers use closed-loop linkages on their sailplanes. It seems that most were used on the rudder, some on the elevator and even some on an occasional full-flying stab. This system of having two

(Continued on page 132)

GIANT STEPS

(Continued from page 116)

inch-span sport model tips the scales at about 14 pounds, and it flies on anything from a .60 to an ST 3000. Like many sport models, the Roadrunner isn't a pretty bird, but its ugliness indicates that it's easy to build! The Roadrunner is built like the well-known brick structure and will withstand abuse.

The plan shows two fin/rudder combinations: a stable one for beginners and a more maneuverable one with a slightly reduced rudder. I think the Roadrunner would be a good project for a novice large-scale modeler. It should fly well and be able to take the treatment it might receive from a new pilot.

The second plan is for a Pfalz DXII from Bob Holman Plans.* This Pfalz was designed by the well-known British designer Dennis Bryant who has created several plans and regularly participates in scale competition. (He does very well, thank you!) This Dennis Bryant plan is an example of excellent research and draftsmanship.

The original plan was drawn at 2 inches to 1 foot, and this 1/4-scale version seems to be a photo enlargement of the original. In general, I'm not keen on this type of enlargement, but this one is accurate and well done. Although the dimensions on the plan sheets are the original scale, it wouldn't be difficult to convert them to the larger scale. I'd have no reservations about building this WW I German fighter.

The Pfalz has an 84-inch span and is 60 inches long. As usual, the Bryant plans show plenty of scale detail, and this makes it possible to produce an accurate model. The detail is so complete that it even includes a scale propeller and several scale documentation references. If you're into WW I scale, try this unusual project—you won't see this Pfalz model at every scale rally or contest!

PLANS DIRECTORY

ViP Publishers, Inc.* has released its "Directory of Large Scale Plans, Volume II." It contains details of 50, 1/5-scale and larger plans, including thumbnail sketches of the original airplanes. It reviews the degree of difficulty, special skills, tools, or materials needed to build the models, and any special handling that might be required during construction. Also, there's information on sources of accessories and documentation materials. If you're a plans builder, Volumes I and II will provide you with information on 100 plans of WW I to post-WW II aircraft as well as racing, home-built and non-scale giant planes.

By next time, I'll have been to the QSAA Rally in Las Vegas, NV, which attracts modelers from all over the world. In an upcoming article, I'll tell you about some of the exciting, innovative models that participated in the event. In addition, some interesting racing is being promoted in California, and I plan to bring you comprehensive details.

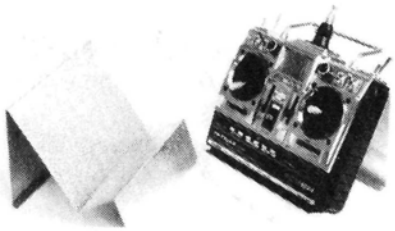
That's a wrap for this month. I hope you'll join me next month for some more good stuff on building *big!*

**Here are the addresses of the companies that are mentioned in this article:*
***Balsa USA,** P.O. Box 164, Marinette, WI 54143.*
***Fun Fly,** Box 1686, Lander, WY 82520.*
***Bob Holman Plans,** P.O. Box 741, San Bernardino, CA 92402.*
***ViP Publishers, Inc.,** P.O. Box 16103, Colorado Springs, CO 80935.*

■

PRODUCT NEWS

Descriptions of new products appearing in these pages were derived from press releases by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by Model Airplane News, or guarantee product performance. When writing to the manufacturer about any product described here, be sure to mention that you read about it in Model Airplane News.



IKN CORP. R/C Transmitter Stand

Designed by renowned R/C enthusiast Kenneth Hotard, the new R/C Transmitter Stand will help you keep your expensive transmitters clean and dry, regardless of field conditions. Keep your sensitive electronic equipment within comfortable reach, but safely above the dirt, wet grass, mud, etc. Portable, durable and light, this product provides a stable, accessible transmitter platform for fliers, boaters and car enthusiasts.

Price $14.95, plus $3.50 S&H

For more information, contact IKN Corporation, P.O. Box 24938, New Orleans, LA 70184.

ACE R/C Micropro-8000 Transmitter

Ace R/C's Micropro-8000 is a microprocessor-driven, 8-channel transmitter. It has auto trim, eight-aircraft memory, universal mixing and a logical layout. This transmitter is for all applications, including pattern, helicopters, hi-tech soaring, scale, racing and sport. Set-up is a snap with the menu-driven LCD display, and it's programmed and built by Americans, so it's easy to understand. Complete systems and retrofit packages for updating existing Silver Seven transmitters are available for 27, 50, 53, 72 and 72MHz AM frequencies.

Price: $395

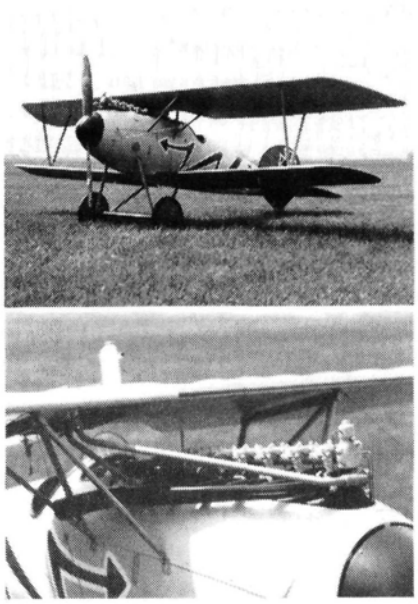
For more information, contact Ace R/C, 116 W. 19th St., P.O. Box 511,

PLANES & THINGS Flex-Mount 90 Motor Mount System

Planes & Things introduces the Flex-Mount 90 Motor Mount System—a vibration-absorbent system that isolates engine-related vibration from the airframe. Designed for optimum performance and isolation with minimum engine motion, its benefits include: a reduction in airframe-generated noise, increased radio-system reliability and extended structural life of the airplane. The mount will accept most .75 to 1.08 2-stroke engines without the need for drilling or machining, and all the necessary mounting hardware is included. The mount is available at your local hobby shop or from the manufacturer.

Part no. FM-90. Price: $24.95, plus $2.50 S&H

For more information, contact Planes & Things, 1226 E. Ave. J-12, Lancaster, CA 93535.



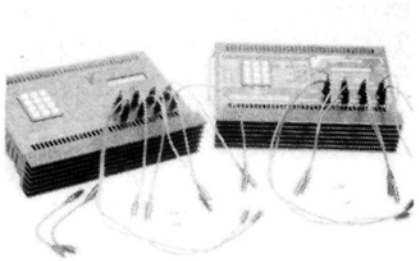
PROCTOR ENTERPRISES Albatros DVa

Proctor Enterprises has announced the release of its new 1/4-scale Albatros DVa, which has already gained considerable recognition at the 1990 Top Gun Invitational and has also qualified for the 1990 U.S. Scale Masters finals.

The 23-pound, 89-inch-span Albatros is powered by either Enya's VT-240 or a Super Tigre 3000. The kit features a scale, semi-monocoque fuselage and a highly detailed Mercedes, in-line, 6-cylinder, water-cooled engine. Even the shutters that control airflow through the wing-mounted radiator are operable. Proctor will also offer specially designed, 7 1/2-inch scale, aluminum disc wheels and scale, wire-spoked wheels for this model.

Price: $695 complete (without wheels)

For more information, contact Proctor Enterprises, 25450 N.E. Eilers Rd., Aurora, OH 97002.

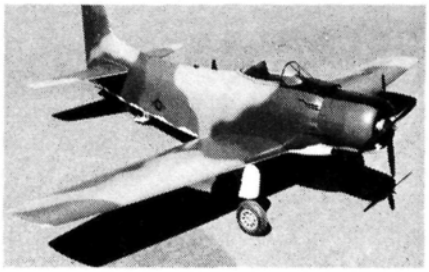


VICTOR ENGINEERING HI-IQ

Now you can "see" what's going on in your motor-pack batteries. The Hi-IQ enables electric fliers to peak-charge and discharge at a user-defined rate, and to measure battery capacity and performance (e.g., starting and ending voltage, milliamps delivered and time). Battery grading (matching), timed cycling and a host of other functions allow you to build and condition your own top-performing packs. Two versions of the Hi-IQ are available. The Hi-IQ Senior (left) offers 16 functions and is specifically designed for high-rate, 20A discharge (25A max). The Hi-IQ Standard (right) offers nine standard functions and can charge at a rate of up to 15 amps and discharge at rates in excess of 15 amps (20A max). Options for the Hi-IQ include a motor-commutation timing adjustment, thermal push-charge and PC hook-up for data-basing, printing and plotting. A new option includes an 8-channel "multiplexer" that performs Ni-Cd functions for up to 8 single cells simultaneously or 8 packs sequentially. Victor's IQ-Power-1 is a featherweight power supply that delivers up to 12 amps of clean, regulated, 14V DC power—great for nearly *any* Ni-Cd charger.

Prices: Hi-IQ Senior, VE-HIIQ Sr.—$449; Hi-IQ Standard, VE-HIIQ—$349; IQ-Power-1, VE-IQPWR-1—$139.95.

For more information, contact Victor Engineering, 380 Camino de Estrella, Suite 170, San Clemente, CA 92672.

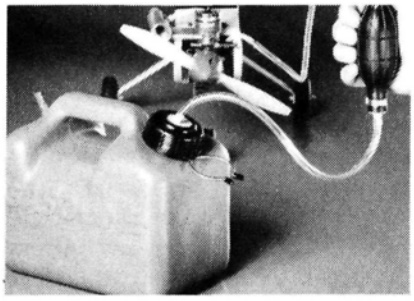


GEORGE MILLER'S KITS A-1H Skyraider

This 90-inch-wingspan Skyraider is one of the best single-engine military aircraft to convert to R/C scale. This ground-support plane has a large wing and tail and the perfect proportions to produce a scale aircraft that flies like a trainer. It's designed around the ST 2500-3000-size engines and Robart retracts. The kit includes a fiberglass fuselage, a cowl, a rudder, wheel housings, a canopy and a foam-core wing and stab with all the sheeting and pre-cut wood.

Price: $400

For more information, contact George Miller's Kits, 1140 Civic Center Dr., Rohnert Park, CA 94928.



DU-BRO PRODUCTS E/Z Fill Fuel Pump

The new Du-Bro E/Z Fill Fuel Pump will fill you with satisfaction! It accepts glow fuels, gasoline and diesel fuel, and it can exceed 1 1/2 ounces of fuel with each squeeze, or supply as little as a drop or two for primimg. To empty your fuel tank, just turn the pump upside-down. The E/Z Fill Fuel Pump is sold separately, or it comes complete with a sturdy, 1-gallon, no-tip fuel container.

For more information, contact Du-Bro Products, 480 Bonner, P.O. Box 815, Wauconda, IL 60084.

TOWER HOBBIES 1991 Annual Catalogue

The 1991 Tower Hobbies Annual Catalogue has just been released. This year's giant, 288-page 20th Anniversary Edition includes more than 10,000 exciting R/C products and specialty accessories from over 300 manufacturers—all at discount prices. It also has reference charts, helpful hints and how-to information, and separate product and manufacturer indexes so that you can quickly find information. Also, the exclusive Accessory Completion Guides give you easy-to-follow checklists of everything you need to complete each model.

Price: $3

For more information, contact Tower Hobbies, P.O. Box 778, Champaign, IL 61824.

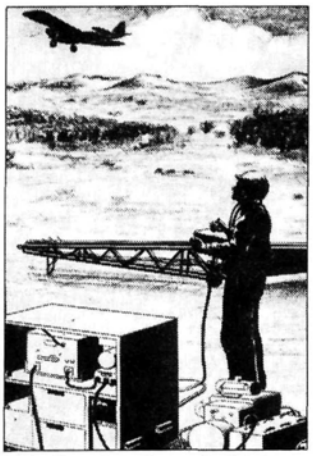
GOLDEN AGE
OF RADIO CONTROL

by HAL DEBOLT

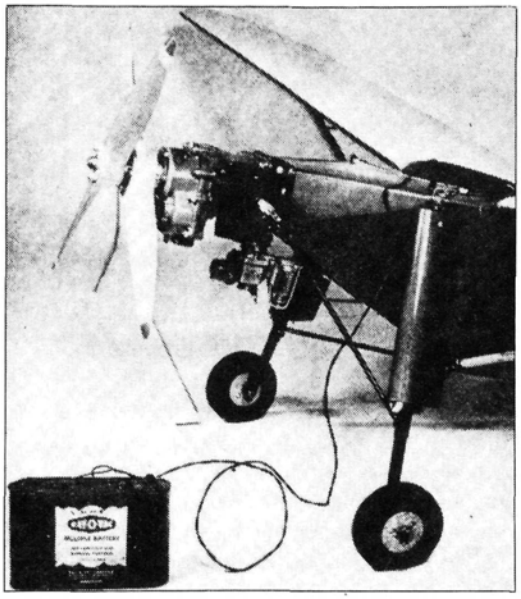
A hard-working drone?

WHAT'S A "DRONE"? To the military, it's a pilotless aircraft operated by remote control, and at one time, it was used for training. Their uses are obvious: pilotless test flights and target practice!

Perhaps it all started in WW I with Kettering's Flying Bomb, which had rudimentary control; and in WW II, we evaluated several remote-control craft at the Naval Air Test Center. Designed to carry torpedoes to designated targets, a couple of these had simple, steel-tube fuselages, front-mounted Continental engines and Cub-style wings and tails. Most impressive were the little derivatives of the Culver Dart that were used for target practice!



This drawing showed GIs how to operate the target airplane. They had no knowledge of R/C!



Here's the special twin-cylinder engine and coaxial gear-box used on the OQ 2A. The booster battery was used to start the engine.

These were more sleek than the usual drone and would be a great choice for OT scale R/C!

Among all these aircraft was the diminutive OQ 2A R/C target airplane, which was little more than a glorified model. (In fact, most of today's R/C trainers have more sophisticated flight capabilities!) One reader (wish I hadn't lost his name!) sent me a copy of the OQ 2A tech manual, and it tells us much about military-spec R/C and their personnel requirements in the mid-'40s.

THE DRONE WASN'T ALONE!

Eight men were assigned to the OQ 2A: a lieutenant pilot, an assistant pilot, two mechanics (for the engine), three technicians (for the radio) and a parachute rigger. Talk about having enough help and confidence in the equipment! Specifications tell us the pilot had to have 20/20 vision and a "stable nervous condition"!

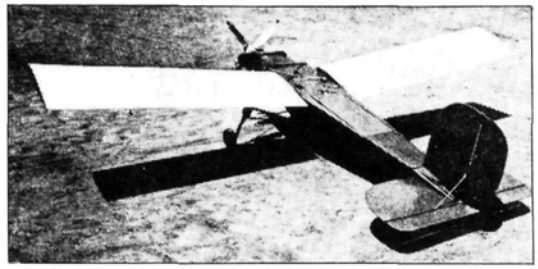
DRONE DESIGN

The OQ 2A's design was elementary: it had a shoulder wing of ample area and considerable dihedral; a simple, "boxy" fuselage; and a normal tail plane that looked as if it could benefit from an increase in stab area. Its construction followed full-scale methods more than those of model-building: chrome/moly steel tubing was used extensively for the fuselage and tail, and covering seemed to be the common, doped, aircraft fabric. Its 146-inch span would put it into our giant-scale category, but we'd probably find its wing loading of 91 ounces per square foot rather excessive! Its flying weight was 110 pounds; its fuel capacity, 1.8 gallons; and it used *two* 26-inch props. With the NACA 23012 airfoil, it must have glided like a brick!

Its engine was particularly interesting—a twin cylinder, 2-stroke, 17ci displacement, apposed firing type with ignition. Fueled by a gas/oil mixture, the ratio was varied according to the viscosity of the oil available (SAE 10 required a 5:1 mixture, and SAE 40, 10:1). The octane wasn't important: anything from 73 to 100 was acceptable.

Apparently, the only speed control was spark advance. (The first engines had a manual control, and a later mod had automatic spark advance.) Sincethe engine was started by hand-cranking, the spark control was really necessary, but it's difficult to understand the use of exotic contra-ro-

(Continued on page 126)



This view of the drone shows the storage hatch that holds the landing parachute.

FIFTY YEARS AGO

(Continued from page 75)

for this well-known star. Powered by a .010 Atom engine, this versatile model could easily be converted into a seaplane.

The column goes on to commiserate with modelers who live in Vermont. "Ninety-nine times out of a hundred, the plane will land in the tree tops, on a mountain or in some dense thicket that has little respect for a good-looking suit of clothes." Although it's not entirely clear why one would be wearing a good-looking suit in a dense thicket, it's clear that *MAN* was glad to hear from Vermont—"Model news from Vermont is a rare treat."

MAN also heard from The Denver Exchange Gas Model Club. Despite Denver's altitude problems (it's at 5,280 feet), it was the site of two world championships. At one contest, a crowd of 2,000 gathered to watch 63 fliers go through their paces.

Here are some "Flash News" flashes: 45 Consolidated PT-3A biplane trainers were converted into tricycle types and equipped with radio control so that they could be used as target planes (drones) for antiaircraft training. Most of these ships were sent to coastal artillery bases like Hawaii, Puerto Rico and the Panama Canal. (Read more about drones—past and present—in this month's "Golden Age of R/C.")

After three of his crew bailed out during a heavy storm, the pilot of a giant Consolidated PBY flying boat made an emergency landing in a remote area of southwest Texas. He wasn't hurt, and the undamaged ship was eventually dismantled and shipped back to San Diego. That scrubby piece of land dotted with cows must have looked pretty good to that pilot. ■

ROBBE WHOPPER

(Continued from page 98)

Face the Whopper slightly to the left (say, 15 degrees from straight) and into the wind. Bring the throttle trim halfway up, and spin the rotor blades manually to start them. Now engage the clutch assembly. (You might hear some alarming squeaks, but they're normal.) If your motor quits, disengage the clutch and restart it. This time, engage the clutch with the throttle trim farther forward.

When the motor has started and the blades are spinning, gently increase power to full. The Whopper will accelerate quickly. After about 20 feet, disengage the clutch and, soon afterward, the Whopper will lift off. You can keep the rotor engaged longer, but you must have it disengaged before liftoff, or your Whopper will be difficult to control.

Once it's airborne, get some altitude and "feel the Whopper out." You'll notice that you must use your rudders a lot more than when flying a plane. Remember, it's *impossible* to stall your Whopper! Steep approaches are fun and easy. You'll soon see that by holding aft cyclic, i.e., up-elevator, and adjusting the throttle, you can fly the Whopper at speeds that approach a walking pace. When landing in a slight breeze, you can literally make a vertical approach with no roll-out.

The Whopper will also fly fast and is quite agile (it seems to turn in its own length). The Whopper is capable of loops and rolls, but attain a reasonable altitude and forward speed before you attempt these maneuvers. The Whopper isn't difficult to fly, but you must have experience with four channels. Avoid letting the Whopper fly too far away, because you might get disoriented.

(Continued on page 131)

tating props on such a simple craft. (We know that the complexity of contra-rotation restricts its use on full-scale airplanes.)

The OQ 2A was controlled by rudder and elevator, and there was also parachute deployment and engine shutoff. There was neither throttle control nor ailerons, and except for the parachute deployment, its control was comparable to that used by modelers then.

The radio would have fit into our "band-pass" or audio-tone-discrimination style of decoding. A single carrier frequency was modulated by five audio frequencies that ranged from 300 to 3,000 cycles per second. Each tone operated an individual relay, which, in turn, activated the servo in the desired direction.

The servo circuitry must have been like that in our reed types. Each tone closed its particular relay to drive the actuator in the associated direction. There would have been switches

Home-Built R/C Target Drone

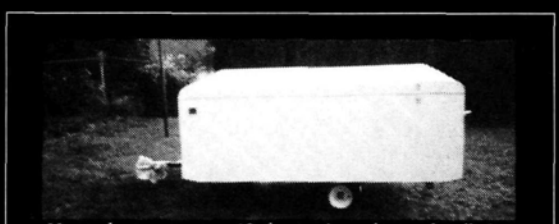
Fred Collins' OQ 2A target airplane is an exact replica of the WW II R/C drone. Fine flier! Ready...aim...fire!

TODAY, giant-scale—1/4-, 1/3- and even 1/2-scale—R/Cs are common, and it seemed inevitable that someone, sooner or later, would go to full-scale R/C!—enter OT R/Cer Fred Collins of Pittsburgh, PA (and original Selinsgrove fame) with his exact replica of the OQ 2A drone target airplane! Building big is typical of Fred's R/C philosophy; in the Rudder Bug days, he powered his Bug with a big fat .60 when .30s were the norm!

Fortunately, as I was gathering info on the OQ 2A, old friend Fred checked in and mentioned his! When many of us saw surplus OQs on the market after WW II, we were tempted to try flying one! It took many years for Fred to succumb to that temptation, and by that time, the surplus craft were long gone, but you can trust a modeler not to be stymied!

He spent many months on research, and he gathered enough data to build a replica. Considerable help came from an ex-Navy "ARCT" (Aircraft R/C Target) man who provided data and photos, including some showing his WW II exploits with them in the South Pacific! A very useful Northrup-Venture Corp. book entitled, "50 Years of Target Drone Aircraft" provided a complete history, from the original Reginald Denny "radio plane" to the present. With the data and photos, Fred was able to reproduce the missing drawings, and he started to build.

As well as being a fine flier, Fred's replica weighs less than half the original—48 pounds instead of 110!—because he substituted aircraft spruce and plywood for the original metal and steel tubing. Obviously, this weight reduction accounts for his ability to power it with one of our chain-saw-type engines instead of a big twin, which the original required. What's more, Fred'sdrone flies from takeoff to landing, so he doesn't need a catapult and a parachute. So much simpler!



How do you get a 12-foot aircraft to the flying field? Collins' OQ 2A project has a special trailer.

"DRONING" ON!

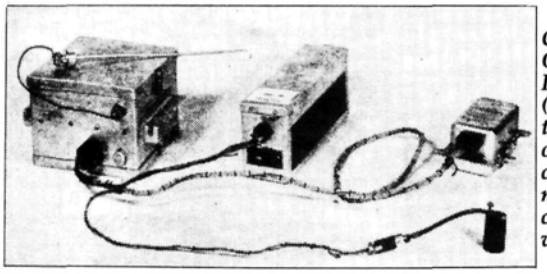
So how does it fly, and was the project worth the effort? Fred's answer is very positive; he says it duplicates the original's performance well. If you attended the Selinsgrove Re-enactment, I hope you saw it flying. Fred writes:

The OQ 2A replica in flight; ex-military pilots might recall the frustration trying to down them!

"Early flights produced some hair-raising experiences during cross-wind landings; the OQ 2A yawed drastically on the approach, and this made touchdowns rely on a hope and a prayer! The original was never intended to be landed and came down by parachute, so, for safety, I added ailerons to the replica, and landings were a piece of cake."

Apart from that, Fred says he had to forget his model-flying techniques and fly the OQ 2A à la full scale—you know, use coordinated controls at all times. Of course, this isn't unusual with giant sizes and many other designs, but I wonder why size makes a difference? In any event, Fred logged many flights and showed how well his replica duplicates the original's flight envelope. He says he treats his OQ 2A as an airplane—and not a model—in all respects, and he reminds us that there is a big difference—safety.

Fred says that during his research, he never found the word "drone" mentioned before WW II, but that all previous references were to "aircraft targets." The worker drones had yet to be born!



Compare the OQ2A's robust R/C system (only three controls) with your own multi-control equipment. We've come a long way!

to limit the travel and others to return it to neutral through the usually closed relay contact. Though the manual mentions only one servo, there must have been another one to release the parachute and switch off the engine. The parachute audio tone was a constant signal that was switched off by the control box when any other tone was sent, so there was no need for simultaneous modulation, which would have further complicated the circuitry.

Obviously, the parachute channel's receiver decoder was broad enough to accept all five tones. As a safeguard, it was arranged that the parachute relay be held closed when the radio was operating. Turning off the radio allowed this relay to open, and this broke the actuator circuit, deployed the parachute and switched off the engine after a 1-second delay. Apparently, the delay was intended to be insurance against those early R/C glitches!

We read that only one servo operated both rudder and elevator. This was possible because only one control in one direction could be used at a time (just like our reed systems). The servo was actually a Duplex affair that used two motors—one for rudder and the other for elevator. Beyond that, with only one apparent gear train and some "Rube Goldberg-style" gimmicks, it's a mystery how the servo differentiated between the two controls!

The transmitter was powered by an engine-driven generator (APU, or Aircraft Power Unit), it had a whip-style antenna, and an extension cord connected it to a single-stick control box, with which any Schmidt or Bramco owner would be familiar.

The main idea behind this radio resembled that of one later offered by Babcock Radio Control. The similar Babcock system weighed about 24 ounces, and if you're ex-military, you can imagine the weight of the OQ 2A's system!

DRONE'S AWAY!

Flying the OQ 2A was quite an undertaking. First, the transmitter was set up and the APU brought up to operating output. Then the "bungee"-cord-powered catapult was primed and the OQ 2A attached to it. After that, an auxiliary starting battery was connected, and the was engine "hand-propped" into action. On a signal from the pilot, the engine spark was advanced and the catapult power released. As long as no one flubbed his assignment, the OQ 2A was off and flying!

As with reeds, much of the flying was left to the inherent qualities of the drone itself. Because it had control in only one direction at a time, they could do little more than head it in the *general* direction in which they wanted it to go. When I watched Navy GIs flying these things, I saw them splatter two out of three! To bring the drone down, a button was pushed to cut the engine and deploy the parachute—obviously, at a safe altitude—and who knew where the touchdown would be!

What a difference we've seen over the years. Compare the OQ 2A with today's missiles, etc., or even with modern R/C! Who says they were the "good old days"? ■

ROBBE WHOPPER

(Continued from page 125)

SUMMARY

The Robbe Schluter Whopper Autogyro kit is of extremely high quality, the instructions are well-written, and the plans are well-presented. Even modelers with intermediate skills will find it a delight to fly. I made only two changes, and they were designed to increase scale realism: I installed a Du-Bro* 2¼-inch spinner and a Williams Brothers* standard, 3-inch pilot. The Whopper accepts most .60-size motors, and it requires a 5-channel radio. The O.S. 61 FSR and the Futaba 7GH helicopter radio I chose have worked flawlessly and seem to be good choices for the Whopper.

The Whopper flies well and should have a wide appeal. Mine draws an interested crowd whenever I fly it. That's a good idea...I think I'll go fly it right now!

**Here are the addresses of the companies mentioned in this article:*
Robbe Model Sport, *180 Township Line Rd., Bell Mead, NJ 08502.*
O.S.; *distributed by Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.*
K&B Manufacturing, *12152 Woodruff Ave., Downey, CA 90241.*
Futaba Corp. of America, *4 Studebaker, Irvine, CA 92719.*
Du-Bro Products, *480 Bonner Rd., Wauconda, IL 60084.*
Williams Bros. Inc., *181 Pawnee St., San Marcos, CA 92069.* ■

ENGINE REVIEW

(Continued from page 112)

Everest, it's there...!

The maximum torque of 365 ounce/inches at 5,200rpm is 20 percent less than open-exhaust levels, and the final maximum bhp of 2.54 at 9,093rpm is an even larger (37 percent) reduction in hp. These both illustrate the restrictive nature of this O.S. muffler and its understandably strong ability to suppress noise. It generally gave a reduction of between 10 and 14dB on open-exhaust figures.

Why is it so effective? There's a double chamber inside a normal, back-pressure, expansion-style muffler. On escaping from the exhaust port, the gas expands into the first chamber and then exits through a 14mm hole in a flat disc; the gas then expands in the rear chamber and finally leaves the engine through a standard 12mm pipe. This simple, efficient system is, in effect, two silencing boxes in series and, to test this principle further, I added yet another expansion muffler to the final 12mm exit pipe. In fact, I tried four: a J'Tec add-on device; an old Amps "garbage-can" muffler (car type); a 3.5cc quiet tuned pipe (car type) and a standard OPS 29/40 quiet tuned pipe (aircraft type). The last one had the largest extra-expansion volume, so—not surprisingly—it offered the greatest noise reduction, and it even showed a further average drop of 2dB without noticeable rpm loss at around 8,000rpm.

This is all rather bulky, of course, but additions of this kind would clearly be useful in situations where noise is a real concern.

IDLING

Using a 20x6 Zinger, a standard muffler and the associated fuel-pressure line, the BGX-1's idling speed was a gracefully lazy 1,800rpm. As O.S. claimed, pick-up was swift and secure (given the carburetor's simple design and the high inertia of the large propeller).

(Continued on page 132)

ENGINE REVIEW

(Continued from page 131)

FUEL CONSUMPTION

My tests confirm the manufacturer's fuel-consumption figures of 700cc in 10 minutes. Their advice to set fuel controls on the rich side—particularly for the first few flights—is sensible. My test figures also show the more economical results of operating at maximum power after running-in has been completed.

SUMMARY

The BGX-1's construction seems to be even more rugged than previous engines, and this fits it to its designed task. This, and its clearly good condition at the end of my tests, shows that O.S. has made a wise choice in designing a large engine specifically for models, rather than converting a small industrial engine to our use.

There seems to be no reduction in O.S.'s obvious pursuit of a high-quality finish and construction accuracy, and it was a pleasure to test this particular O.S. product. ■

QUIET FLIGHT

(Continued from page 120)

control horns on one surface (one opposite the other on each side) gives a slop-free, very positive control hookup. The only drawback that I could see is that it also puts a side load on the servo output shaft. Some of the modelers I talked with said that the less expensive standard servos were affected by this side load, while others said they had never had any problems.

The linkage is set up with a horn on both sides of the control surface in a normal relationship to the hinge line. To guide the control cables, two tubes are run in the fuselage. Use a thin, flexible, plastic-coated cable or U-control cable. Make a loop through the control horn, and secure it by passing the cable back through a small piece of tubing, which is then crimped to secure it. A piece of plastic pushrod material with a hole drilled in it is secured with a loop at the servo end. This can then have a threaded lug screwed into it, and a clevis can be used in the usual manner. Each cable is then made snug with the control surface at neutral.

The big advantage with this type of linkage is that there's no slop in the actuation of the control surface. When the surface is deflected, one cable pulls as the other relaxes, and the two are always balanced—no slop, no flutter; just positive control. This type of linkage can be used on all control surfaces with good results. Give it a try, and let me know how you like it.

QUIET FLIGHT

ELECTRIC VERSUS GLOW POWER

In a recent conversation with *MAN* Editor Tom Atwood, I discussed the differences between glow-powered and electric flying. Tom had read my review of the Midwest Electric Hots, and he thought that I made it sound as though the model could do almost anything that its glow-powered counterpart could do. Although the Electric Hots is one of the very best aerobatic electrics I've ever flown, I have to admit that there's a difference between what it can do and what can be done with a glow-powered model. This raises the question of what can be expected from an electric model.

Most of our 7-cell models have wing areas of about 300 to 400 square inches—the same as most .10- to .15-size kits. The glow model will naturally be lighter, which gives it a better power-to-weight ratio and a lower wing loading. This will allow it to accelerate or climb faster and land more slowly. An electric, on the other hand, carries much more weight for roughly the same amount of power. The electric model must be flown on "step," i.e., at the best attitude that will allow the motor to unload and produce its best power output. There's a need to let the model "fly," rather than to let it be hauled around the sky by the motor and prop.

This is why it's so important to keep electrics light. Because we don't have to deal with the vibration caused by a piston going up and down several thousand times a minute, we can build lighter planes that carry more weight. In my opinion, we can't expect to get raw performance that equals that of glow power with 6- or 7-cell flight systems, although the gap between electric and glow is constantly getting smaller.

Right now you can get an equal (or darn close to it) performance if you move up to larger electric systems. The 15-,25-, 40- and 60-size electric systems produce power that would truly surprise most power fliers. The 15 and 25 systems are very close to producing power that's equal to that of a glow-powered model. Ron DePinto of Fountain Valley, CA, recently completed an "electrified" remake of the Pilot Tiger Moth 20. His finished model weighed 4.5 pounds, and it was powered by a direct-drive Astro Cobalt 25 on 14 1200mAh cells. Ron used an APC quiet prop, which he claims greatly enhances the model's performance compared with a conventional wooden prop. I've seen the

(Continued on page 137)

CLASSIFIED

Send ad and payment to *Model Airplane News*, 251 Danbury Rd., Wilton, CT 06897.NON-COMMERCIAL CLASSIFIED ADS (commercial ads of any kind not accepted at this special rate). Rate: 15 words or less, $4.50 payable in advance. No charge for name and address. Additional words, 25¢ each. COMMERCIAL CLASSIFIED ADS (rate applies to anyone selling on a commercial basis–retailers, manufacturers, etc.) Rate: 50¢ per word, payable in advance. Count all initials, numbers, name, address, city and state, zip and phone numbe**CLOSING** DATE for either type of ad is the 20th of the third preceding month (for example, January 20th for the April issue.) We do not furnish box numbers. If you would like your ad run in more than one issue, multiply amount of payment by number of months that ad is to run. It is not our policy to send sample copies of tear sheets.

WANTED: Model airplane engines and model race cars made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063; (918) 245-3649.

PLANS ENLARGED, Large Scale Specialists. PC *Model Software. Free information. Concept,* P.O. Box 669E, Poway, CA 92074-0669; (619) 486-2464.

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ANTIQUE IGNITION AND GLOW PARTS CATALOGUE: 100 pgs., timers, needle valves, original cylinder heads, point sets, drive washers, stacks, spark plugs, plans. Engines: Atwoods, Baby Cyclones, McCoys, Hornets, others. $8 postpaid U.S., Foreign $20. Chris Rossbach, R.D. 1 Queensboro Manor, Box 390, Gloversville, NY 12078.

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WANTED: Model engines and race cars before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105, (806) 622-1657.

USED ENGINES WANTED—Ignition, glow, diesel. Send description and price for prompt reply. T.Crouss, 100 Smyrna St., West Springfield, MA 01089.

WANTED: Kyosho, Eureka, Aristo-Craft, Super Constellation Kit and other multi-engine kits; B-25, C-124, etc. Peter Pizzorno, 6130 Lake Ave., Orchard Park, NY 14127.

INVENTING! You are doing it now! Let us show you how to bring in cash. Free info. Kohler, Box 278-A, Twinsburg, OH 44087.

SWAP & SELL BARGAIN SHEET: Hundreds of items offered or wanted by modelers just like you! $2.50 per month or $20 per year subscription. Check or money order to: Bargin Publications, 1050 Faust Dr., Caro, MI 48723. Listing your items is free! Just call (517) 673-7116 or send the information to the address above.

PRIVATE COLLECTION: Hundreds of aviation magazines for sale: *Popular Aviation; Model Airplane News; Air Trails; RAF Flying Review; Wings,* and many others (1932-1960). All in excellent condition. For list, send $2 to William C. Fort, Jr., 4161 Robin Hood Rd., Jacksonville, FL 32210.

WANTED: old proportional R/C systems; special interest in SPAR, C&S DIGICON, DEANS, INTERGRATED DESIGN, GALAXY, QUADRUPLEX MARK II and others. Ron Gwara, 21 Circle Dr., Waverly, NY 14892. (607) 565-7486.

ENGINES: Ignition, glow, diesel. New, used, collectors, runners. Sell, trade, buy. Send SASE for list to Rob Eierman, 504 Las Posas, Ridgecrest, CA 93555. (619) 375-5537.

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PLANS FOR THE FOKKER D-7 AND SE-5A, in manageable 1/5 scale. Easy to build and fly, these two *Rhinebeck* combat winners were designed with the sport flier in mind. 75-inch wingspan with over 1,700 square inches ensures light wing loading and gentle flying. Power with .90 2-stroke through G-38 gas. Plans, instructions, cowling and plastic detail parts for either design; $36.95 (postpaid U.S.). Rich Uravitch, 15 Newcomb Trail, Ridge, NY 11961-2238. (516) 929-4132.

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CLUB OF THE MONTH

AERO DUMPMASTERS

P.O. Box 1643, San Juan Capistrano, CA 92693

The Aero Dumpmasters have their share of crashes, and the club's newsletter—the "Aerodumper"—is full of stories about their good days and their bad days. Usually, it goes something like this: "On Sunday...we flew without many problems...except for my [Aero-star's] dead-stick landing in the weeds...and Julius's snap landing"! Talk about looking on the bright side!

And then there was the time the local sheriffs showed up for a visit. Club Director Dave Herbert wanted to put on a really good demonstration; unfortunately, he forgot to turn on his heli's throttle-hold switch. The heli did a low-level roll and crashed. Dave may have avoided a citation, but the repairs cost $95; at least, the deputy enjoyed the show! It makes you wonder how many of these guys' planes end up in the "Aero*dumpster*"!

The club's members follow a "live and learn" philosophy, though, and all these mishaps have made them pretty good at improvising their way out of potential disasters. When his heli's tail-rotor-pitch rod became disconnected from the clevis, Dave Herbert kept it moving so that the tail "weathervaned" to the back, and then he executed a fixed-wing type of landing.

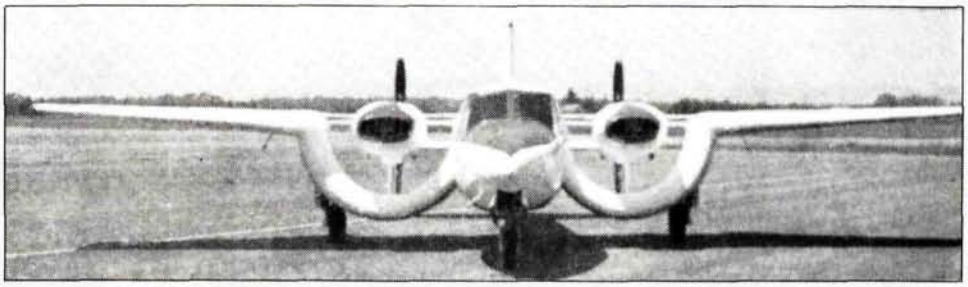
Despite their bad experiences, the Aero Dumpmasters are still willing to try new things—some more successful than others. Recently, they've been towing aloft a glider with a Telemaster. Once, the battery ran out of juice, and the sailplane did "about 150 loops" before plummeting to earth. Now they know: if your tows are long and high, make sure your batteries will last! The Dumpmasters' next projects?—a Heli-Vector and a slope-soaring heli. And, of course, they enjoy night flying. (See Dave Herbert's article in this issue.)

The Aero Dumpmasters have the right attitude. They take the bad days in their stride, learn from their mistakes and share their solutions to problems. (This issue of the newsletter tells how to make Dave Herbert's clever landing-battery circuit.) The newsletter announces when members have performed their first heli loop or mastered touch-and-go's, and there are plenty of photos of their accomplishments. For their optimism, determination and camaraderie, we're sending the Aero Dumpmasters two free *MAN* subscriptions. Congratulations for being our "Club of the Month"!

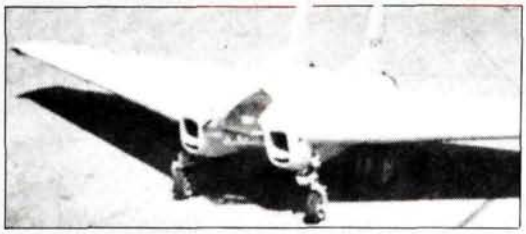
NAME THAT PLANE

CAN YOU IDENTIFY THIS AIRCRAFT?

If so, send your answer to Model Airplane News, **Name the Plane Contest** (state issue in which plane appeared), 251 Danbury Rd., Wilton, CT 06897.



Congratulations to James Merkel of Ridgecrest, CA, for correctly identifying the Douglas XB-42 Medium Attack Bomber that appeared in the December '90 issue. Jim's was one of 44 correct entries received.



An experimental mid-wing designed for the Air Technical Service Command, the XB-42 first flew in June 1944. It was powered by two Allison 1,725hp, liquid-cooled V-1710-125 engines. Located in the mid section of the fuselage and mounted side by side, the engines were connected to counter-rotating pusher propellers that were mounted behind the rudder on an extension shaft. The two propellers could be feathered independently and either engine shut down. The plane had separate, side-by-side bubble-type canopies for the pilot and copilot/navigator, and the bombardier sat in the glazed nose section.

With a wingspan of 70 feet and a length of 53 feet, the XM-42's empty weight was 19,149 pounds, its fully loaded weight was 35,702 pounds, its maximum level speed was 410mph, and it had an operational range of approximately 5,000 miles. On May 17, 1946, a jet-powered version (the XB-43) took off successfully, but this design was never pursued. ■

The winner will be drawn four weeks following publication from correct answers received (on a postcard delivered by U.S. Mail), and will receive a free one-year subscription to **Model Airplane News.** If already a subscriber, the winner will receive a free one-year extension of his subscription.

QUIET FLIGHT

(Continued from page 133)

design fly with an O.S.* .25 stroke and with a .40 stroke. The performance with the Cobalt 25 was as good as the performance with either glow engine. I was surprised when the model exhibited slow-flight capabilities that were as good as the lighter glow-powered versions.

Except for the absence of noise, I doubt that any power flier could have told you what the powerplant was. The only real difference was that the electric version had a slightly lower top speed. Another interesting point is that when the battery power ran out, the Tiger Moth exhibited an excellent glide. Vintage biplanes aren't well known for this. Generally, the drag is so great that when this type of model goes "dead-stick," it has problems penetrating. The electric version weighs slightly more and glides beautifully. "Dead-stick" with an electric?—no problem!

Finally, if you haven't seen an Astro Cobalt 40- or 60-powered model fly, you don't know what you're missing. I've seen Bob Sliff's (a former "electric" columnist for *MAN*) 60-powered Ace 4-60 flying, and I think it actually flew better than it would with a 4-stroke .60. I've seen the F3E team's Cobalt 60-powered competition models fly, and it's truly beyond description. Using a Casio peak altimeter watch, we timed team member Jerry Bridgeman's 6½-pound model climbing out to 950 feet in only 9 seconds!

One area in which electrics fall behind glow power (in the larger systems) is flight duration. The more power we produce, the shorter our flights, but advances in battery technology are narrowing this difference. Before long, there really will be no difference between electric and glow power—except for the noise!

Till next time...good thermals and a full charge!

**Here are the addresses of the companies mentioned in this article:*
***AstroFlight,** 13311 Beach Ave., Marina Del Rey, CA 90292.*
***Great Planes Model Manufacturing Co.,** P.O. Box 788, Urbana, IL 61801.*
***Jomar Products,** Knightsbridge Dr., Cincinnati, OH 45244.*
***O.S.; distributed by Great Planes Model Distributors,** 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61820* ■

ADVERTISER INDEX

SPORTY SCALE

(Continued from page 90)

addition to those I've already mentioned, you can expect to see Rick Lewis and that fabulous Skyraider, Don Smith and a new Henschel 129, Charlie Chambers' flawless Focke Wulf 190 A-8, Chuck Fuller's new, Byron-sponsored, SU-26M Sukhoi and a host of demonstration equipment such as you've never seen! You can call toll-free 800-327-4204 if you'd like to stay at the headquarters hotel but don't delay, because there are only a limited number of rooms for non-pilots.

UNLIMITED AIR RACES

Before closing this month, I'd like to address the many calls I've received about the Unlimited Air Race competition to be held later this year. By now, I'm sure you've seen the rules: 100-inch-wingspan minimum and a maximum weight of 55 pounds! That's it! Any piston engine, any radio, and any scale model of any airplane that ever raced at Reno are allowed. It looks like a dandy event—something I'd sure like to be a part of. I've received all the race literature, and can see that it's *all* put together very professionally. The promoters have even started a fancy newsletter and promise it will do wonders for our sport (possibly more than Top Gun, because it has far greater spectator appeal for those who aren't interested in modeling itself). I'm behind these people all the way and will help to promote this event in any way I can—but I need the promoters to give me a definite date and location of this unbelievable race. When I get that info, I'll share it with you and provide you with as much coverage as I can. As for now, I only know that the Unlimited Race will be held somewhere in California, sometime in late October and the preregistration fee (due now) is $65, but will be credited toward your $165 entry fee. I'll keep you posted.

Well that's about it for this month, scale fans. Until next time, drool over the nice pictures, get your radio "1991-imized," give Cindy a call about Top Gun, and don't forget to check your six!

**Here are the addresses that are pertinent to this article:*
Frank Tiano, *15300 Estancia Lane, West Palm Beach, FL 33414. Tel: (407) 795-6600.*
Col. Stunning Plans; *available from Rich Uravitch, 15 Newcomb Trail, Ridge, NY 11961. Tel: (516) 929-4132.*
Davie Travel *(ask for Cindy Burkey). Tel: (305) 472-7900.*
American Airlines. *Tel. toll-free: 1-800-433-1790.*
Nick Ziroli Plans, *170 Oval Drive, C., Islip, NY 11722.*
R/C Unlimited Racing, *565 Mercury Ln., Brea, CA 92621.*
Jet Model Products, *304 Silvertop, Raymore, MO 64083. Tel: (816) 331-0356.* ■

LETTERS

(Continued from page 13)

QUEST FOR SMOKE

Our models are very colorful, but the smoke is always white. Do you have any suggestions as to how we can produce colored smoke from our R/C models?

LUCAS DEWEERDT
Antwerp, Belgium

Lucas, if one of our enterprising readers has the answer, we'll either reprint it here or give it more in-depth coverage in an article. TA

SKYRAIDER KIT SEARCH

I thoroughly enjoy your magazine. It's very informative and enjoyable. I'm trying to find a scale kit for a WW II at tack plane that I think is called an A Skyraider. Do you know where I cou find a kit? Thank you very much.

JEREMY ALLE
Phoenix, A

Jeremy, the Skyraider—a ground-suppo aircraft with large wings and tail surfaces—is a beautiful warbird and one that doesn't seem to have been modeled a lot—although this is now likely to change! Two new kits of this plane are available. Check out George Miller's A-1H Skyraider (George Miller Kits, 1140 Civic Center Drive, Rohnert Park, CA 94928) and Rick Lewis' AD-6 (AccuScale R/C Model Products, 15486 Duke Lane, Chino Hills, CA 91709). TA